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ORTHOPEDIC SUPPLEMENT

American Osteopathic Academy of Orthopedics

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CONTENTS

Justification of open reduction of elbow fracture in three adolescents 571
Karl P. B. Madsen, D.O., Oakland, California

Ring fusion of the lumbar spine 574
A. E. Miller, D.O., Los Angeles, California

A three-year survey of treatment of congenital talipes equinovarus at Detroit Osteopathic Hospital 583
Lloyd L. Mrstik, D.O., C. H. Heleotis, D.O., J. Paul Leonard, D.O., John P. Wood, D.O., Detroit, Michigan

Orthopedic problems in metastatic carcinoma 585
Arnold Gerber, D.O., M.Sc., Philadelphia, Pennsylvania

The bone graft 588
Harold E. Clybourne, D.O., F.A.C.O.S., Columbus, Ohio

Treatment of vertebral body compression fractures 591
Jack D. Hutchison, D.O., Columbus, Ohio

Neurogenic sarcoma. Differential diagnosis and treatment with presentation of three cases 593
John Douglas Segel, A.B., D.O., Los Angeles, California

Justification of OPEN REDUCTION of elbow fractures in three adolescents

KARL P. B. MADSEN, D.O.
Oakland, California

THE FOLLOWING CASE histories are unrelated to one another as to type of injury, but all have features which in the opinion of the author warranted operation.

Case histories

Case 1. A 14-year-old white male was admitted to the hospital on February 22, 1954. He gave a history of having fallen on the left elbow while bicycling, 2½ hours prior to admittance.

Examination revealed a healthy boy with the left elbow region greatly swollen and deformed. The olecranon process was displaced posteriorly and the distal end of the proximal fragment of the humerus was palpable immediately under the skin in the antecubital fossa. There was no break in the skin or evidence of vesication. The arm and hand appeared moderately cyanotic, and the radial pulse was absent. Neurologic investigation revealed hypesthesia in the distribution of the median nerve. No paralysis was present. Upon slight flexion of the elbow, the radial pulse returned at intervals. No other injury had been sustained.

Radiograms disclosed an oblique supracondylar fracture with much displacement of the distal fragment (Figs. 1 and 2).

A serious attempt at closed reduction failed to disengage the distal end of the proximal fragment from its position in the antecubital fossa. A Steinmann pin therefore was inserted through the olecranon process, and the patient was returned to bed with the arm suspended in nearly vertical traction and the elbow flexed to 135 degrees. Radiograms showed no improvement in alignment.

The extremity was watched for several hours and it was thought that the radial pulse was palpable at intervals. The skin remained cool and cyanotic. After 8 hours of observation, the oscillometric reading revealed no pulsation below the elbow.

When a second attempt at closed reduction failed, the fracture site was approached through a ventral bayonet incision. The distal end of the humerus was encountered directly under the skin. It had pierced and was tightly enmeshed in the musculotendinous junction of the biceps brachii. The brachial artery had not been perforated, but lay tightly compressed over the razor-sharp edge of the bone. The task of extricating the fishtail-shaped humeral fragment from the muscular hiatus was extraordinarily formidable, thus accounting for the unsuccessful previous manipulation. Liberation of the brachial artery immediately restored pulsation at the wrist.

The ensuing manipulation of the fragments indicated that satisfactory alignment could be obtained by traction and slight flexion. This method therefore was elected as definitive treatment to spare the elbow from further instrumentation.

The patient was lightly anesthetized 8 days after surgery for correction of the lateral displacement and flexion of the elbow to 75 degrees. A posterior splint incorporating the Steinmann pin achieved adequate immobilization (Figs. 3 and 4). The patient was discharged on the twelfth day.

Re-examination of the extremity 2 years later revealed 5 degree limitation in extension of the elbow joint. Muscular development and all other movements were physiologic. (Figs. 5 and 6).

Case 2. A 15-year-old white male was admitted to the hospital December 4, 1951, 2 hours after injuring the left elbow in a wrestling bout. The subjective history indicated good health. Examination revealed much swelling and deformity of the forearm and elbow, with a small exit wound in the skin 3 inches from the olecranon process. The radial pulse was not disturbed, and there were no neurologic deficiencies.

Radiographic survey showed an oblique ulnar frac-

Fig. 1 Fig. 2 Fig. 3 Fig. 4

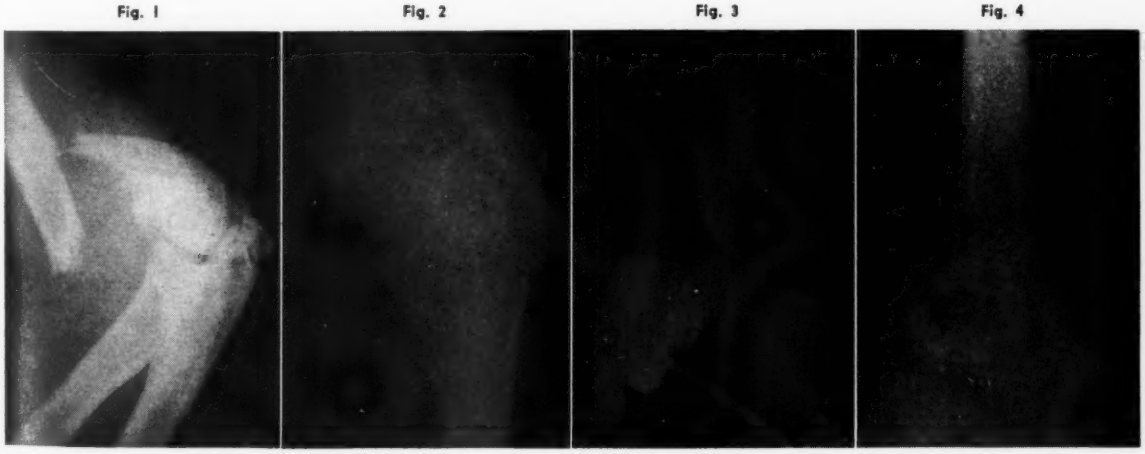

Fig. 5

Fig. 6

ture 3 inches from the elbow joint. The radial head was dislocated, fractured through the epiphysis, and displaced into the anterolateral aspect of the antecubital fossa. The proximal end of the radial shaft was displaced medially in the antecubital fossa (Figs. 7 and 8). An effort to improve the alignment proved unsuccessful; hence open reduction followed.

A posterolateral incision exposed the elbow joint. The orbicular ligament had been partially disrupted and the radial head lay completely detached in the antecubital fossa. Further exploration brought the radial neck into view, firmly held by the biceps tendon which was wound once around the stump. Replacement of the radius into its normal environment was easily accomplished after pushing the tendon off the radial neck. Inspection of the loose radial head disclosed that approximately half of the epiphyseal plate was missing. The fragment was found in the wound and discarded. Repositioning the radial head on the neck by repairing the orbicular ligament appeared unsatisfactory because of instability. Attention therefore was directed to the ulnar fracture, which was fixed with two vitallium screws. The elbow joint was flexed to 85 degrees, the radius positioned, and the radial head balanced on the end of the neck. A beaded Kirschner wire, driven from a posterior approach through the humeral condyle, impaling the radial head and continuing well into the shaft, provided excellent immobilization of the fracture-dislocation (Figs. 9 and 10). The wire was cut above the bead, the incision closed, and a plaster shell applied.

The postoperative period was uneventful. Six weeks after surgery, the full arm cast and wire were removed. The forearm was returned to a short cast and elbow exercises were begun. All immobilization was discontinued 2 weeks later.

The patient was kept under observation for about 6 months, during which time extension and flexion improved. Pronation and supination were nearly nil with the forearm fixed in neutral position.

Five years later, at age 20, the patient was asked to return for re-examination of the elbow (Figs. 11 and 12). The upper extremities were identical in muscular development. Flexion and extension were normal bilaterally. Supination and pronation of the left forearm were limited to an excursion of 10 degrees from neutral position; the carrying angle measured 15 degrees on both sides. The patient stated that he had no pain and was never conscious of disability or handicap as a result of the limited movements in pronation and supination.

Case 3. A white male, age 13, was referred to me on March 2, 1952. The patient had reportedly injured the right elbow joint 3 months previously in a football game. He had been taken to the family physician who made radiograms which showed a posterior dislocation of the ulna on the humerus. The boy was anesthetized, and the dislocation was reduced by the doctor. After the manipulation, the arm was bound in an Ace bandage and the wrist suspended from a cravat.

A month later it was noted that the elbow motion remained limited in extension. Consultation was declined by the father for 2 additional months, for financial reasons.

The present examination showed moderate generalized muscular atrophy of the extremity. The right elbow joint could be flexed to 35 degrees and extended to 105 degrees, as contrasted to 30 degrees and 180 degrees on the left side. Pronation and supination were not restricted. The carrying angle was 25 degrees on the right side, and 15 degrees on the left side.

Roentgenograms showed the medial epicondyle situated in the ulnohumeral joint, resulting in subluxation. Calcareous deposits were noted near the radiohumeral articulation. Excision of the epicondylar fragment was advised in anticipation of improved extension.

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Fig. 12

The joint was approached through a posteromedial incision and the ulnar nerve retracted anteriorly for additional exposure. Identification and removal of the epicondylar fragment were facilitated by radiograms when it was recognized that the mass was poorly defined, after 3 months duration, and had become firmly and smoothly sealed to the ulnar articular surface (Figs. 13 and 14). The flexor muscle were reattached to the epicondylar region and the ulnar nerve replaced in its groove. Convalescence was uneventful.

The patient was requested to report for re-examination 4 years later, at age 17. He stated that he had occasional minor discomfort in the elbow during damp weather, but he was aware of no disability. The right elbow joint could be extended to 160 degrees, the left to 180 degrees. Flexion was 40 degrees bilaterally; the carrying angle was 10 degrees bilaterally. Supination and pronation were normal. (Figs. 15 and 16). The muscular development of both upper extremities was identical.

Comment

No generalization can be made concerning justification of open reduction of adolescent elbow fractures. Rather, each case must be considered separately.

With respect to Case 1, the writer concluded there was risk of Volkmann's ischemia if the antecubital fossa was not explored immediately after the first manipulation when no reduction had been accomplished. The humeral fragment was obviously impeding circulation or had occasioned a rupture of the brachial artery.

Referring to Case 2, it is generally accepted that the radial head should not be removed in a growing child. It is also generally agreed that fractures of the radial neck with various degrees of tilting of the head can be corrected by closed or open methods and offer a good prognosis. In this case, the complete displacement of the radial head presented a questionable outlook for its survival. However, Key[1] reported excellent results from repositioning in a younger child with a similar fracture; hence, the head was repositioned.

It has been stated by Blount[2] that an inclusion fragment of the medial epicondyle in the ulnohumeral joint should not be removed after 3 months duration. In Case 3, however, the decision to undertake surgical correction was made because of considerable limitation of motion of the elbow joint. The status of the elbow after 4 years indicates that excision of the epicondylar fragment, though delayed, was advantageous to joint function.

Conclusion

In selecting a mode of therapy, it must be decided whether or not the results expected from relatively poor alignment will be superior to those of open reduction, with its attendant operative trauma, disruption of circulation to the bone, and risk of infection.

460 Staten Ave.

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1. Key, J. A.: Survival and growth of epiphysis after removal and replacement. J. Bone & Joint Surg. 30-A:150-152, Jan. 1949.

2. Blount, W. P.: Fractures in children. Williams & Wilkins Co., Baltimore, 1954.

Discussion

JOHN D. SEGEL, D.O., Los Angeles, California: The presentation of these three cases by Dr. Madsen offers no opportunity for the somewhat violent but instructional discussions that usually follow the presentation of a paper in this Academy. The orthopedic concepts expressed are in complete accord with my ideals concerning this problem. Operative intervention in adolescent elbow fractures is indicated only rarely, but certain specific fractures and complications, such as those presented in this paper, will occasionally arise and necessitate operative procedure.

Fig. 13

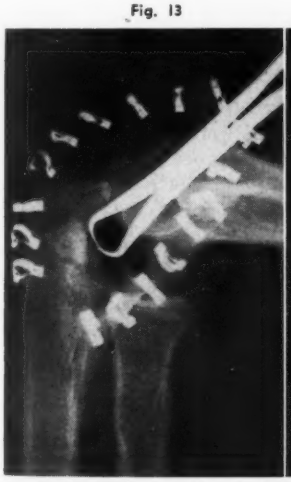
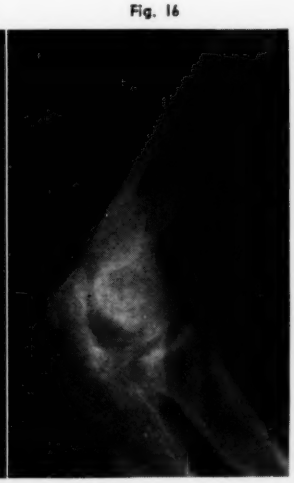


Fig. 14

Fig. 15

Fig. 16



In Case 1, the impending Volkmann's ischemia following serious attempts at conservative therapy constitutes one of the indications for operative treatment in adolescent elbow fractures. Absence of the radial pulse is a danger signal which cannot be ignored, but it is not in itself an indication for operative intervention. Also, the classic triad of pain, pallor, and paralysis is often reversible, following the loosening of a tight bandage or decreasing the amount of flexion in the immobilized elbow. If, however, the triad persists following conservative therapy, as occurred in this case, procrastination is no longer in order and immediate surgical intervention is imperative. The avoidance of internal fixation in this case, thus sparing the elbow from further instrumentation, accounted in a large part for the excellent functional end result, once the trapped components in the antecubital fossa had been freed.

Case 2 presents many of the characteristics of a reverse-type Monteggia fracture-dislocation in which the prognosis is extremely poor. To this difficult fracture-dislocation complex was added the additional insult of a comminuted and displaced fracture of the radial head. There is no need to comment on the excellent outcome of this case, but rather to commend the salvage of even a portion of the indispensable radial head in a growing child. Repositioning of half of the radial epiphyseal plate resulted in this patient attaining full growth with no alteration in the normal carrying angle nor any disturbance of the distal radio-ulnar articulation.

In respect to Case 3, regarding the removal of a 3-month-old inclusion fragment of the medial epicondyle, if the restriction of extension had been in the neighborhood of 10 to 20 degrees it would definitely have been best to follow Blount's[1] advice of masterly neglect. However, with a 75-degree loss of extension, altered carrying angle, and demonstrable osseous block, surgical excision of the epicondylar fragment would constitute my form of therapy.

I wish to thank Dr. Madsen for the privilege of re-emphasizing a few of the orthopedic principles that were so well covered in his excellent paper.

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Reference

1. Blount, W. P.: Fractures in children. Williams & Wilkins Co., Baltimore, 1954.

RING FUSION

of the lumbar spine

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WHENEVER A MULTIPLICITY of technics for a specific surgical procedure is encountered, indications are that a single technic is not applicable to all circumstances and anatomic variations. So it is with arthrodesis of the lumbar spine. Each of the well-known technics has its advantages and disadvantages either as to technical requirements or individual case adaptability. This paper is not constructed to delve into the history of arthrodesis of the spine and elaborate upon the recognized procedures, but rather it constitutes a preliminary report of a technic I have utilized over the last 2 years. It is offered with the hope that it will increase the armamentarium of technics for the orthopedic surgeon to use in surgery of the lumbar spine.

For several years my associate, Dr. T. L. McHenry, and I discussed and studied alternate technics for arthrodesis of the lumbar spine, particularly where it is utilized immediately following laminectomy. The two most commonly used procedures have been facet arthrodesis with internal fixation of the facets by screws and by the "H" graft. The former technic was used predominantly by one of us (TLM) and the second technic predominantly by the other (AEM).

The screw facet arthrodesis, when utilized without supplementary bone grafting, is a reasonably rapid and effective technic; however, it has been our practice to supplement the facet arthrodesis with laminal gutter grafts from the iliac crest. Results show that this composite procedure is more sure to produce solid fusion and is less subject to pseudarthrosis. However, it is somewhat time consuming, and if the surgeon is not experienced, it offers hazards by virtue of proximity of the operative site to important structures such as dura and nerve roots. It is not practical in those cases where gross anatomic deviation makes the placing of the fixing screws technically difficult or impossible. Further, there is always the possibility of metal reaction producing osteolysis around the screws and the subsequent requirement of removing the fixative apparatus which lies deep and is difficult to approach.

The "H" graft has been utilized with almost universally satisfactory results, although there are certain time-consuming features in the form of removing the graft and fashioning it to fit. Also, in cases where arthrodesis is to be performed from the fourth lumbar vertebra to the sacrum, the removal of the fifth lumbar spinous process presents a technical hazard for subsequent procedures, in case pseudarthrosis develops. However, the main disadvantage of the "H" graft concerns the small percentage of patients who, following laminectomy and fusion, develop secondary intraspinal lesions such as adhesions or secondary herniations, and may require additional surgery. The rather massive extent of this graft and the coverage of the spinal canal requires long and tedious dissection of the osseous components to develop an intraspinal exposure.

In 1952, we approached the problem of an alternate technic for lower lumbar sacral arthrodesis, predicated upon the anatomic mechanics of the modified Albee[1] graft, using iliac crest as the donor. The objective was to permit a posterior segmental arthrodesis and still leave adequate space for re-entry into the spinal canal if it should ever become necessary.

The first approach to this problem was by removal of the cortex from the spinous processes on the opposite side to the laminectomy, and attaching thereto the outer plate of the ilium along with the attached cancellous bone by the use of screws, placed transversely through the graft. This proved technically to be a most difficult procedure, particularly when the first sacral segment presented little if any spinous process. And there was the further necessity of right angle drills and screw drivers which could not be made to assume the right angle attitude.

Realizing that the above procedure was not practicable, I recalled that the application of rings through the noses of the pigs, which I had seen as a boy upon the farm, was a simple and fast procedure, and I

Fig. 1

thought that it might be adaptable to spinal surgery. During the time that the application of this potential technic was being discussed, there appeared an article by McKee[2] describing this type of ring technic. His procedure was to apply the rings loosely, fill the space with tibial splinters, and then tighten the ring to hold the splinters in place. After reading this article, we approached the problem with new enthusiasm but felt that more satisfactory results could be obtained by use of cancellous bone, with its properties of more rapid osteogenesis and better cohesion. The Richards Manufacturing Company of Memphis, Tenn., was asked to make up a series of stainless steel rings and appropriate pliers for application. The instruments are demonstrated in Figure 1, the background being a 9 by 12½ inch clipboard.

A technic was then developed wherein the iliac crest posterior section was removed. One of us (AEM) split the donor graft (Figs. 2 and 3) and

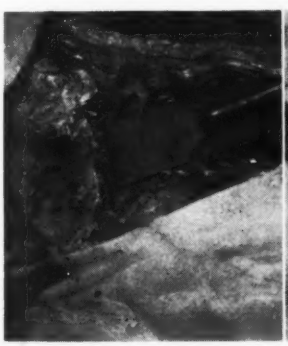

Fig. 2

Fig. 3

applied the pieces to each side of the denuded spinous processes of the segments to be fused and clamped in place with the modified pig rings, which encircled the graft and bit into the base of the spinous processes as they attached to the lamina. One of us (TLM) removed the cortical section from the spinous processes and the lamina on the opposite side of the laminectomy, applied the iliac transplant (consisting of cortex and attached medullary bone) with raw surfaces together, and clamped them in place as described above.

This procedure produced rather rapid and adequate immobilization; however, the rings, being circular, caused a certain redundancy of metal without contiguous compression against the graft and the spinous processes. Consequently, one of us (TLM) suggested and drew up a modification of the ring, a somewhat hexagonal shape, as depicted in Figure 4. We again called upon the services of the Richards Manufacturing Company and consequently the Miller-McHenry spinal staple came into being. When applied, the straight sides of the appliance lie flat against the graft on one side and the spinous process on the other, and clamp firmly into the base of the spinous process and/or lamina, creating a firm fixation. When iliac crest is used, the Miller-McHenry spinal staple works most efficiently. However, in those cases where bank bone is utilized, such as sections of tibia or femur where one of the surfaces has a semilunar contour, the ring rather than the staple proves more satisfactory. In those cases, the curve of the ring follows the curve of the donor bone smoothly, holding it tightly and tidily to the host. During application, the graft may be held in place by Lyon forceps while the rings are being applied (Figs. 5, 6, 7, and 8).

Following the application of the major graft to the spinous process and/or laminal gutter, accessory grafting may be performed if desired. Additional cancellous pulp removed from the iliac crest may be placed along the gutters or associated with denuding of the articular facets, but without the utilization of screws.

The follow-up care for this type of arthrodesis varies to some degree with the rigidity of the internal fixation applied at the time of surgery, the demeanor of the patient, and the attitude of the operating surgeon. Most of these patients are ambulatory approximately 1 week following surgery. One of us (AEM) occasionally uses plaster for a few weeks or a Williams brace with subsequent corseting; the other (TLM) usually utilizes a simple Camp surgical corset. After the first postoperative week, ambulation is increased in capacity to tolerance short of symptoms. The average patient may return to sedentary occupation in approximately 8 weeks. No heavy physical occupation is permitted, however, until such time as arthrodesis is demonstrated roentgenologically.

Twenty-two cases have been operated upon by the two of us, using one of the variants of the above technic. So far there have been no instances of pseudarthrosis or nonunion. There has been drainage in two cases; it is felt that one was the direct result of contamination, and the other apparently the result of hematoma with secondary infection. Drainage ceased spontaneously in the second case about 3 months postoperatively,

Fig. 4

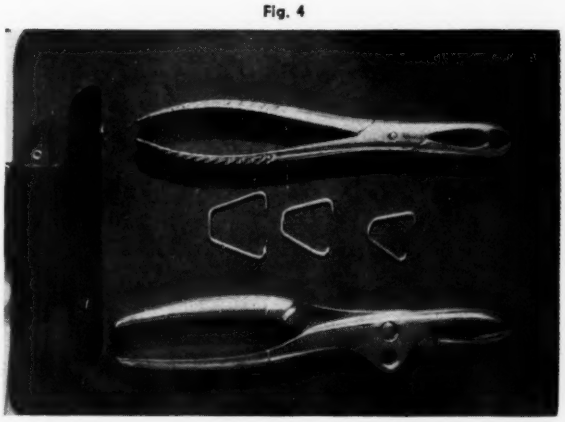

Fig. 5 Fig. 6 Fig. 7 Fig. 8

and the patient has had no more trouble since that time. In the first case, drainage started approximately the fifth postoperative day and continued for approximately 1 year, until secondary débridement with removal of metal was performed. In this case, union progressed on schedule without pseudarthrosis in spite of the drainage.

It is my opinion that the new technic is relatively simple, is reasonably rapid to apply, is physiologically sound, permits early ambulation, reduces technical difficulties to a minimum, and avoids the hazards of some other technics. The more we utilize it, the more favorably impressed we become; we feel that it has a place in the operative technics of the orthopedic surgeon.

Six cases in which this technic was used, and which have been selected as representative, follow.

Case reports

Case 1. A 45-year-old white female was first seen on May 12, 1954, with a complaint of pain in the lumbosacral area. The pain was somewhat more on the right than on the left, and occasionally radiated down the lateral aspect of the right thigh. She had never had pain down the left thigh or leg, but the right leg pain had been present for the last few months. There was an occasional burning in the lateral aspect of the lower thigh, varying in area, with the largest area being that of the size of the palm. Déjerine's triad was absent, and no other sensory changes were noted.

The first backache was not a result of injury, but came about 10 years ago, when she was mopping the floor and had an acute "catch" in the lumbosacral area. Following conservative treatment she became asymptomatic after a time. Since that time periodic acute episodes responded to 2 or 3 months of conservative therapy. However, she had more or less continuous dull pain for the entire 10 years. She gave a history of having cut the tendon of the left heel on a piece of glass at the age of 16, and as a result had favored the right leg in standing and walking. She noticed a dull ache in the low back after being especially active, and found relief when she was off her feet or when she decreased her activities generally. There was no history of tuberculosis, diabetes, or cardiac disease, and no history of surgeries.

Physical examination revealed a well-nourished, slender female, appearing near her stated age of 45 years. There was an old scar over the left Achilles tendon, but the tendon itself was intact. There was some generalized atrophy of the gastrocnemius and soleus of the left lower extremity. Neurologic examination was essentially negative, the reflexes being active and equal, and no dermatomes were traceable. She had a mild lordosis; the iliac crests were equal, as were the points of the rhomboid of Michaelis. She was able to forward flex, touching her hands to the floor. All in all, there was good mobility of the lumbosacral area, and the over-all weight-bearing lines were satisfactory. An x-ray series taken June 15, 1953, and brought in by the patient, consisting of anteroposterior, lateral, and right and left oblique views of the lumbosacral area, were reviewed (Figs. 9, 10, 11, and 12). A bilateral pars interarticularis defect was seen.

The diagnosis was lumbosacral instability (early spondylolisthesis), and arthrodesis was recommended. On March 17, 1954, arthrodesis was done from the fourth lumbar to the first sacral vertebra, using the circular type of ring.

This patient was seen periodically following the surgery, and she made an uneventful recovery. The

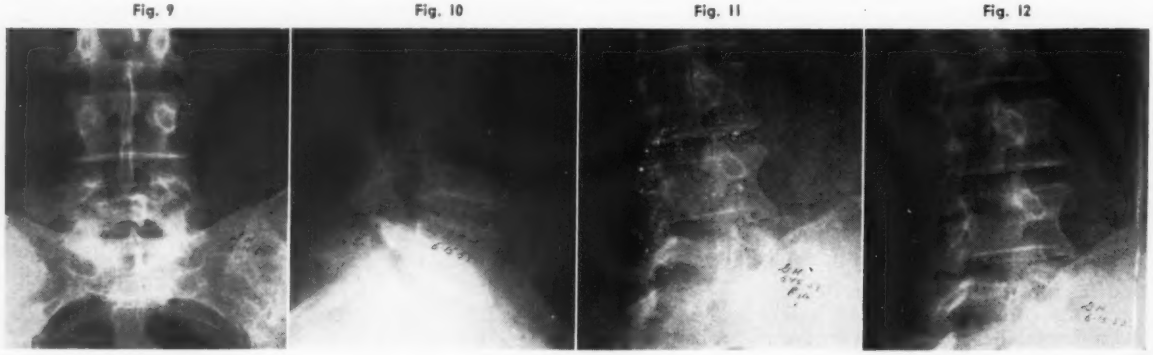

Fig. 9 Fig. 10 Fig. 11 Fig. 12

Fig. 13

Fig. 14

last time she was seen was January 12, 1956, and anteroposterior and lateral x-rays were taken at that time (Figs. 13 and 14). Clinically and radiographically, the graft was solid, and the result was considered satisfactory.

Case 2. On March 19, 1954, a 37-year-old white female was first seen, her chief complaint being a nonradiating type of pain in the lumbosacral area. She stated that her right hip and shoulder were higher than the left. Déjerine's sign was present. She had no sensory changes in the extremity.

The onset was without injury on March 6, 1954, when she was getting out of the bath tub and felt a pulling sensation in the low back. This became and remained very acute except that some days she felt a little better than others. The pain increased when she was on her feet. She stated that as long as she lay on a heating pad she could obtain complete relief. Her past history revealed that her first backache occurred in 1935, after which she was involved in an automobile accident and the fifth lumbar vertebra was fractured. It took 5 months for her to recover from this accident. She also had some mild dorsal trauma and this area was still sore to touch. She did quite well following the accident until about 5 or 6 years ago when she had an acute episode, similar to the one she had at this examination, which lasted about 1 month. Episodes occurred every couple of years, until 2 years ago when she had two attacks within 3 months of each other. She stated that she always had a dull ache at the end of the day, especially if she had been on her feet a great deal. Wearing high-heeled shoes gave her a severe backache. She had no dyskinesia after inertia. She had had no tuberculosis, diabetes, or cardiac disease. An appendectomy was done in 1940.

Physical examination revealed a well-nourished female, appearing near her stated age. While sitting on the examination table, she bore most of her weight on her hands. When standing, she had a list to the left that caused the right iliac crest and shoulder to be somewhat higher than the left. There was considerable flattening of the normal lumbar curve. All ranges of motion were definitely limited and painful. The Gaenslen, Fabere-Patrick, Ely, Thomas, and other tests indicated the pathologic condition to be lumbosacral rather than sacroiliac. The Lasègue test was negative bilaterally. Neurologic examination was essentially negative. There were no alterations in the reflex pattern and no dermatomes were traceable.

Anteroposterior, lateral (Figs. 15 and 16), and right and left oblique x-rays, taken in this office on this date, revealed bilateral pars interarticularis defect with a spina bifida at the first sacral segment. The diagnosis was lumbosacral instability with acute myositis.

The patient was given 40 units of ACTH intramuscularly and was placed in an antigravity cast. She was given the usual instructions regarding swelling, cyanosis, cast care, et cetera, and was instructed to return to this office 4 days later. It was mentioned to the patient at this time that she should seriously consider having an arthrodesis done in the not-too-distant future. Within 4 days the patient's back was asymptomatic, and she continued to be asymptomatic until the time of surgery.

Arthrodesis was performed from the fourth lumbar vertebra to the first sacral, on April 5. Following arthrodesis the patient was placed in a P.C. Williams open back brace. On August 27, she fell and had some discomfort at the graft site, however, that lasted only a week or two. She was instructed to start gradually discarding the brace on January 6, 1955. She was last seen on October 3, 1955, and had made an excellent recovery. Anteroposterior and lateral x-rays on that date revealed adequate take of the graft (Figs. 17 and 18) and clinically the graft was solid. The patient was doing a normal amount of work, and the end result was considered satisfactory.

As noted, this patient sustained a fracture of the fifth lumbar vertebra in 1935 as well as having the pars interarticularis defect and spina bifida of the first sacral segment. This history was typical in minimal instability with considerable symptomatology that had been felt over a long period. Arthrodesis gave a satisfactory end result.

Fig. 15

Fig. 16

Fig. 17

Fig. 18

Fig. 19

Fig. 20

Fig. 21

Fig. 22

Case 3. A large, 32-year-old white male was seen on January 5, 1954, with a complaint of pain in the right lumbosacral area. He had never had any pain on the left side, and there was no radiation. Déjerine's triad was present. The pain was not increased when he was on his feet; however, he did have a definite tired aching feeling in the low back after being on his feet for any length of time, gradually increasing prior to this date. The fatigue-type pain in the low back had been present for many years. He described a rather severe post-inertia dyskinesia in the morning, stating that it took until the middle of the morning before he was able to move about with some degree of comfort. The pain definitely decreased when he was off his feet, and he was completely comfortable lying down. He had no sensory changes.

This syndrome started about 1937 after he lifted a heavy oil drum. He had treatment a couple of times a year until the last year or so when the syndrome started to increase. Two years ago he consulted a doctor and a ¼-inch lift was placed on the sole and a ½-inch lift on the heel of his right shoe. This kept him almost asymptomatic for several months to a year, after which the syndrome recurred. He had several acute "catches" with a steady soreness in the area. He had not had tuberculosis, diabetes, et cetera. A pilonidal cyst was removed in 1941 while he was in the Armed Forces, and healing took place without sequelae in 7 days.

Physical examination revealed a huge, well-nourished male appearing near his given age and weighing approximately 265 pounds. Postural defects were not notable. The iliac crest, the points of the rhomboid of Michaelis, and the gluteal folds were equal. There was some generalized muscle splinting and tenderness of the low back area. "Punch test" was negative, both standing and lying down. Neurologic examination revealed diminished right Achilles and plantar reflexes, with a dermatome pattern of hypesthesia corresponding with the first sacral vertebra, lateral aspect of the foot, and the sole of the foot, and a hyperesthesia of the fifth dermatome over the lateral right calf. No motor involvement was noted. Lesègue's test was positive on the right. Straight leg raising was accomplished to about 40 degrees, at which point it was apparently stopped by pain. The Bragard test was also positive on the right side. Gaenslen, Fabere-Patrick, Ely, Thomas, and other tests indicated the pathologic condition to be lumbosacral rather than sacroiliac. Anteroposterior and lateral x-rays of the lumbosacral area revealed a spina bifida of the first sacral segment (Figs. 19 and 20). The diagnosis was bulging fifth lumbar disk.

The patient was placed in an antigravity cast and given the usual instructions regarding cast care. He was also given 40 units of ACTH and was asked to return for checking. Should the symptoms of post-inertia dyskinesia continue, 40 units of ACTH twice a week for 2 or 3 weeks were to be given. Suggestions concerning prognosis were necessarily somewhat guarded because of the size of this individual. Plaster immobilization was not expected to be as effective as in a smaller person, but it was planned to keep him in plaster for 2 months and then to apply a P.C. Williams open back brace to be worn for several months. If a conservative approach proved to be of no avail, then laminectomy and arthrodesis would be the procedure of choice.

Following application of the antigravity cast, the patient was again seen on January 9, 1954, at which time he was asymptomatic; however, the cast could actually be slipped off his body. A P.C. Williams back brace was ordered and he continued to progress satisfactorily until January 29 at which time the sciatic type of pain returned. He was again placed in an antigravity cast, but by February 1 he had become much worse. On February 2 myelography was performed, but the myelogram was not conclusive. Laminectomy and arthrodesis were performed on February 6. There was a bulging the size of the tip of the fifth finger in the fifth lumbar disk on the right side, compressing the first sacral nerve root. The fourth lumbar disk was explored and found to be intact. Following laminectomy, which was a routine exposure of the fourth and fifth space with removal of the bulging disk at the fifth lumbar vertebra, arthrodesis was done as in the previous cases, using iliac crest graft.

Following surgery, the patient made an uneventful recovery. On September 9, 1954, he had discarded the brace, and had no pain. He was last seen on February 10, 1955, at which time he remained asymptomatic. Clinically the graft was solid, and anteroposterior and lateral x-rays (Figs. 21 and 22) revealed the graft to be solid radiographically as well.

This patient was chosen out of the series for additional comments because of his great size, and because conservative care was inadequate in taking care of the bulging disk. However, in spite of the size of the individual, the end result was good.

Case 4. A 45-year-old white female was seen on September 30, 1954, with a complaint of pain in the lumbosacral area radiating down the left posterior thigh and calf as far as the heel. Occasionally she had noticed tingling and numbness at the bottom of the left foot and the lateral calf. Déjerine's triad was present.

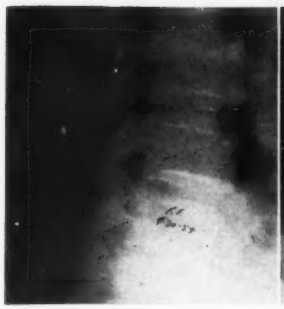

Fig. 23

Fig. 24

Holding her breath and bearing down in the sitting position caused her excruciating pain in the left calf. The pain increased when she was on her feet and decreased when she was sitting down. She occasionally had been able to find complete relief when sitting; however, this had not been so in the past week or so. In the morning the pain in the leg was quite severe and was definitely worse by the end of the day.

Her past history revealed that over a period of approximately 20 years she had had a rather severe attack of lumbago at least once a year, which often required strapping or manipulation. She stated that after a couple of weeks of therapy she would get along all right. About 15 years ago she began wearing a ¼-inch lift in the left shoe to eliminate the backache, and she had been wearing this up until recently, when she was advised by a gynecologist not to wear it any more. She could almost always count on a dull ache in the low-back area after being on her feet or when lifting. Apparently some sort of uterine suspension had been done a year ago to relieve the backache.

The present attack started about 2 months before the patient was first seen. After lifting a table which she stated was not at all heavy, she had a "catch" in the low-back area. She consulted a gynecologist and was given treatment, and the next day was unable to get out of bed because of pain. About 2 weeks before this examination the pain in the leg began. Prior to the onset of the radiation down the leg, the pain was in both buttocks. She finally consulted this office for care. She had been taking Empirin and codeine. She had not had tuberculosis, diabetes, or cardiac disease. A thyroidectomy was done 21 years ago. She had recently been under therapy for a flare-up of her thyroid condition. An appendectomy was done in 1934 and a tonsillectomy in 1942.

Physical examination revealed a slender, well-nourished female whose appearance was near her given age of 45 years. The lumbar area was flat and had lost its normal lumbar curve—as a matter of fact, the back was in slight flexion. There was also some flattening of the dorsal curve. The left iliac crest was somewhat lower than the right and there was a resulting shallow "S" type of scoliosis, the convexity being to the left at about the fourth lumbar vertebra and to the right at about the eighth dorsal vertebra. The patient was able to forward flex, touching her hands to her knees and stopping there because of pain radiating down the sciatic nerve; the curve remained present even in the flexed position. Left lateral flexion was much more painful than the right, and all range of motion was definitely limited. Punching the upper dorsal area in the upright position caused the pain to radiate sharply into the left posterior leg and thigh. Neurologic examination revealed bilaterally equal three plus reflexes of the upper extremities. The patellars were two plus, right and left, and the Achilles was one plus, as was the plantar reflex. The left Achilles and plantar reflexes were absent. There were areas of dullness corresponding to a fifth dermatome and first sacral dermatome on the left lateral calf, the left lateral foot, and the plantar surface of the foot. The patient was somewhat nervous and emotionally upset. Gaenslen, Fabere-Patrick, Ely, Thomas, and other tests indicated the pathologic condition to be lumbosacral rather than sacroiliac or located in the hip. The Lesègue test was positive bilaterally. Straight leg raising on the right side was accomplished to about 50 degrees and to about 40 degrees on the left, stopping there because of severe pain.

Anteroposterior, lateral (Figs. 23 and 24), and right and left oblique x-rays were taken in this office on the day of examination. They revealed severe anomalous seating of the lumbosacral facets, and there appeared to be a pars interarticularis defect on the left side.

A diagnosis of herniating fifth lumbar disk superimposed upon chronic lumbosacral instability was given. The patient was admitted to the hospital and on October 1, 1954, myelography was performed. There was a thumbtip-sized persistent defect of the Pantopaque column at the fifth lumbar vertebra on the left. All of the dye was not recovered. On October 4, laminectomy and arthrodesis were done. There was complete sequestration of the fifth lumbar disk, and the disk material was lying between the fourth and fifth lumbar vertebrae. The herniation was apparently central. Following this procedure and removal of the disk, arthro-

Fig. 25

Fig. 26

Fig. 27

Fig. 28

Fig. 29

Fig. 30

Fig. 31

desis was done from the fourth lumbar vertebra to the first sacral, using three circular-type rings.

About the fifth postoperative day, the patient developed considerable swelling at the incision site, and a hematoma was evacuated. Although some infection may have been present, the course was not febrile or typical of infection at that time. She was kept in a P.C. Williams open back brace. Other than the drainage, she had little or no complaint. The sciatic pain was completely relieved and she had no backaches. On September 15, 1955, almost 1 year following the surgery, the sinus tract was injected (Figs. 25, 26, and 27). On September 17, the patient was reoperated upon, and the sinus tract was found to extend from the skin overlying the fourth lumbar spinous process down to the first sacral segment of the spine. The channel was the size of a fifth finger, and there was frank pus in the tract. The grafted area of bone was surprisingly solid. The inferior ring holding the graft to the sacrum appeared to have metal reaction and was loose. All three rings were removed. Anteroposterior and lateral x-rays (Figs. 28 and 29) were taken on April 30, 1956. Her back was giving no trouble, with the exception of some mild tenderness at the donor site, which had not been previously encountered. One per cent procaine was injected into the area. She was seen again on May 31, at which time the tenderness over the donor site had disappeared. She was asymptomatic without back support, and the final result was considered satisfactory.

This is one of the two patients who had drainage; in the other case, drainage stopped spontaneously approximately 3 months postoperatively, with no trouble since that time. Whether drainage in this illustrated case was due to hematoma becoming secondarily infected, or contamination at time of surgery, I was unable to say; however, I think it was the former. There certainly was some metal reaction when the final surgery was done and the metal removed.

There was an interesting sidelight to this case. The patient had gone back for a recheck on her thyroid problem, and in February 1956 I received a request from the Department of Radiology for information. Apparently the Pantopaque was causing some thyroid difficulty. However, that was cleared up satisfactorily.

Case 5. An 18-year-old white male, seen on January 16, 1956, presented a complaint of pain in the low-back area. The onset had been about Christmas of 1954. The pain was constant and sharp and in the beginning, oddly enough, was mainly one of rest stiffness or post-inertia dyskinesia. There was some radiation down the anterior aspect as far as the knee bilaterally but mainly on the left side. At the time of examination, he had pain only occasionally and that only as far as the left groin. He had no night sweats; however, there was a weight loss of about 16 pounds prior to institution of therapy. The pain was not increased when he was on his feet but gradually became more intense on bearing weight, and after therapy was instituted, he felt much better when off his feet or lying down.

His past history revealed that the only contact he had had with tuberculosis was during babyhood when his father had a spot on his lung. The father was not hospitalized and progressed satisfactorily. The patient had not had diabetes, cardiac disease, or peptic ulcers, and no surgeries.

Examination revealed a thin male, appearing near his given age. His weight was 115 pounds and height was 5 feet 10 inches. He was lying in bed, without apparent distress, in a bilateral bivalved spica, extending from the nipples to the knees. This spica was removed. There was irritation over both iliac crests and also over the posterior iliac spines from rubbing of the cast. When the cast was removed, he immediately put his hips and knees at about 45 degrees of flexion. There was some generalized stiffness of the hips, knees, and back, primarily from being in plaster. Flexion could be accomplished at the hips and knees only to about 90 degrees. A psoas test was negative bilaterally. Neurologic examination revealed the reflexes to be three plus

Fig. 32

Fig. 33

Fig. 34

Fig. 35

Fig. 36

Fig. 37

Fig. 38

Fig. 39

throughout the upper and lower extremities. No dermatomes were traceable, nor was motor weakness noted.

A review of the past history from the charts here at the hospital revealed that the patient was first admitted September 12, 1955. At that time he was febrile, with a temperature of 99 F. Laboratory work done about that time revealed blood sugar to be 85 mg. per 100 cc.; nonprotein nitrogen, 25 mg. per 100 cc.; phosphorus, 3.8 millequivalents per liter; and serum alkaline phosphatase, 4.6 Bodansky units. The Kahn and Mazzini tests were negative. The urine revealed a specific gravity of 1.022; it was acid in reaction, and there was a trace of sugar. Mantoux and coccidioidin tests were negative after both 24 and 48 hour readings. The hematocrit reading was 33 cc. per 100 cc.; erythrocyte sedimentation rate was 36 mm. per hour; hemoglobin was 13 grams per 100 cc.; erythrocytes, 4,250,000; leukocytes, 6,200, with 36 per cent polymorphonuclear neutrophils and 64 per cent lymphocytes.

The patient was placed in a bilateral spica from the nipples to the knees. Streptomycin, ½ gram twice a week, and isonicotinic acid hydrazide, 150 mg. twice daily, were administered. He was also given supplementary multiple vitamins.

His next admission was September 29, 1955, at which time he complained of some pain in his back, although he was afebrile. He had a hematocrit reading at that time of 38 cc. per 100 cc.; hemoglobin, 12.5 grams per 100 cc.; erythrocytes, 4,400,000; leukocytes, 12,000, with 46 per cent polymorphonuclear neutrophils, 52 per cent lymphocytes, and 2 per cent eosinophils. Urine specific gravity was 1.015 and other findings were normal.

He was admitted on October 21 for a cast change, and again on January 13, 1956, for examination prior to arthrodesis. Laboratory work done then revealed the sugar to be 103.5 mg. per 100 cc.; nonprotein nitrogen, 39 mg. per 100 cc.; total protein, 8.25 mg. per 100 cc.; albumin, 4.25 mg. per 100 cc.; globulin, 4 mg. per 100 cc.; serum alkaline phosphatase, 3.4 Bodansky units; hematocrit reading, 39.5 cc. per 100 cc.; hemoglobin, 15.5 grams per 100 cc.; erythrocytes, 4,850,000; leukocytes, 10,600, with 82 per cent polymorphonuclear neutrophils and 18 per cent lymphocytes; and erythrocyte sedimentation rate was 6 mm. per hour. Urinalysis was negative, and the patient remained afebrile.

Results of a series of eight x-rays taken at the hospital on September 12, 1955, were as follows: Three (anteroposterior, spot anteroposterior, and lateral views of the dorsal spine) failed to reveal any pathologic condition. However, two anteroposterior and three lateral views of the lumbosacral area revealed lytic processes involving the superior aspect of the fourth lumbar vertebra and the inferior aspect of the third lumbar vertebra, with invasion of the disk space and some bony proliferation anteriorly and laterally. There was also some involvement of the superior aspect of the third lumbar vertebra. Radiographically, these fulfilled the criteria for tuberculous involvement. See Figures 30 and 31 for anteroposterior and lateral views taken on that date.

An anteroposterior x-ray of the chest, taken on September 14, 1955, revealed some old calcified hilar lymph nodes, but no evidence of active tuberculosis. Anteroposterior and lateral views of the dorsal spine, taken November 15 when the patient was in plaster, again failed to reveal any osseous pathologic change. A chest film taken January 13, 1956, revealed essentially the same findings as noted previously. Also on January 13, a series of seven exposures was studied, including anteroposterior and lateral views of the dorsal spine, which failed to reveal osseous pathology, and an anteroposterior, two lateral, and right and left oblique x-rays of the lower lumbar spine, which revealed the beforementioned process between the third and fourth lumbar vertebrae (Figs. 32 and 33). Some bridging was noted, and the lesion appeared to be inactive as compared to the previous films. The disk space was more clearly delineated. The psoas shadow on the left side appeared to be somewhat more prominent than the one on the right.

A diagnosis of tuberculosis of the third and fourth lumbar vertebrae was given, and surgical arthrodesis from the first lumbar vertebra to the sacrum was recommended. At that time, the prognosis was good for life and fair for recovery, assuming that a good arthrodesis would be possible. This surgery was performed, using bone from the bank—a half section of a fibula and some small bone chips that were packed on the bed.

Following surgery, the patient was placed in a bilateral spica from the knees to the nipples which had been previously prepared and split. The wounds healed per primam and he continued in the cast described. The anteroposterior and lateral x-rays (Figs. 34 and 35) were taken April 12, 1956, approximately 4 months postoperatively. His progress to date has been satisfactory.

Although we had progressed by this time beyond

the point of using circular rings, it was found that in using bank bone, especially the half fibula as in this case, the round rings actually worked better than the hexagonal ring.

Case 6. This patient had a severe scoliosis as a result of an old anterior poliomyelitis. She had been in corrective casts, turnbuckles, et cetera, but the scoliosis was progressive (Figs. 36 and 37). Surgery was performed on March 4, 1954, and using bank bone—tibia in this case. The bone was formed to fit the curve and clamped into place in the previously prepared bed with the metallic rings. The last films available on this patient (Figs. 38 and 39) were taken April 13, 1955, approximately 1 year postoperatively. The patient progressed satisfactorily and, as can be seen in the x-rays reproduced, there is considerable hypertrophy of the graft and no evidence of metal reaction. The patient's progress was satisfactory.

Summary and conclusions

A new type of arthrodesis, used in a total of 22 cases, is reviewed and presented for consideration. In my hands, the technic has much to offer over the previously utilized types of fusion. Six selected cases are discussed in some detail to show that the technic is applicable to many conditions. This is only a preliminary report. This technic is being used more widely by this office, and perhaps in the not-too-distant future more cases can be reported.

Acknowledgment

I am indebted to Richard Stuart, Ph.D., of the Anatomy Department of the College of Osteopathic Physicians and Surgeons, who kindly supplied a cadaver for demonstration of this technic.

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Reference

1. Albee, F. W.: Bone graft surgery in disease, injury and deformity. D. Appleton-Century Co., New York, 1940.
2. McKee, G. K.: Use of wire rings for fixation of spinal grafts. J. Bone & Joint Surg. 35B:258-259, May 1953.

Discussion

CHARLES H. BRIMFIELD, D.O., York, Pennsylvania: The complexity of the problem of spinal arthrodesis is obvious upon consideration of the multiplicity of technics which have been devised in an attempt to obtain the desired result. The matter continues to be a problematical issue whenever stabilization of the lumbosacral area is to be considered, because the incidence of effective treatment has not proved to be entirely satisfactory with any single technic. Dr. Miller has devised a procedure which has not only simplified the standard technics, but also improved their effectiveness.

One of the most disastrous and frequent complications of arthrodesis of the spine is the development of a pseudarthrosis, which is usually the result of inadequate fixation, fracture, and/or absorption of the graft. Whether tibial or iliac graft is utilized, fixation to the spinous processes, and particularly to the posterior surface of the sacrum, is frequently difficult. This is because the spinous process of the first sacral segment is often poorly developed and, as a result, firm stabilization of the graft to the sacrum is extremely difficult or even impossible, when the familiar technics are employed.

The technical procedure of utilizing metallic rings, as described by the author, apparently obtains excellent fixation of the graft to the respective spinous processes of the vertebrae which are to be fused, as well as to the sacrum, thus aiding in eliminating one hazard which has too frequently taxed the ingenuity of every orthopedist.

With this particular technic, the desired result is further enhanced with the utilization of an iliac rather than a tibial graft. The iliac graft reduces the possibility of fracture and/or absorption of the graft to a minimum, because of its greater pliability and osteogenetic powers. In this respect, the author's technic is superior to that described by McKee,[1] who utilizes multiple grafts.

Dr. Miller is to be commended both for his excellent paper and for the development of a technic which appears to simplify the procedure of spinal arthrodesis and also to eliminate some of the technical hazards which are occasionally encountered. Although I have never used this particular technic, it is one to which I shall give my utmost consideration and appraisal.

500 Roosevelt Ave.

References

1. McKee, G. K.: Use of wire rings for fixation of spinal grafts. J. Bone & Joint Surg. 35B:258-259, May 1953.

Record number rehabilitated

A record number of 66,273 handicapped persons were restored to productive employment through the State-Federal vocational rehabilitation program during the fiscal year ending June 30, 1956.

This was the highest total since the start of the public rehabilitation program in 1921 and was about 14 percent above the 57,981 rehabilitated in fiscal 1955.

The record figure includes 65,640 persons restored to employment directly through the State-Federal vocational rehabilitation program. The other 633 persons were placed in jobs through specific projects such as rehabilitation centers and shelter workshops developed jointly by community organizations and State rehabilitation agencies and financed, in part, by Federal grants.

Of the total rehabilitated last year, approximately 3,500 entered such "shortage" professional fields as education, medicine, and engineering. About 8,200 are in skilled trades, and approximately 6,200 work on farms. Most of the others are in managerial, sales, and service jobs or in unskilled work.

Roughly 13,000 of those rehabilitated had been dependent on public assistance immediately prior to or during the rehabilitation process and had been receiving approximately $11.1 million a year in aid payments. The total cost of rehabilitating these people was $9.2 million.

More than 48,000 of the rehabilitants were unemployed at the time they began receiving rehabilitation help, and most of the others were in unsafe, part-time, or otherwise unsuitable jobs or were in danger of losing their jobs because of disability.—*Public Health Reports*, November 1956.

A three-year survey of treatment of congenital TALIPES EQUINOVARUS at Detroit Osteopathic Hospital

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CONGENITAL TALIPES EQUINOVARUS is the most frequent of all the deformities of the foot. It is seen approximately once in every thousand births.[1] The term "talipes" denotes deformity of a foot; "equinus" means plantar flexion; and "varus" means inversion.

Diagnosis

Diagnosis is always evident at the time of birth. On gross examination the heel is drawn up and inverted, producing an equinus deformity. The anterior half of the foot is adducted and inverted, producing a varus deformity. The lateral border is convex; the medial border is concave, as is the plantar surface. The Achilles tendon and the posterior and anterior tibial muscles are shortened, while the peroneal muscles are lengthened. Radiographically, the calcaneus and the talus are superimposed and pointing to the medial metatarsals. Normally, the calcaneus points to the lateral metatarsals and the talus to the medial metatarsals. The navicular is displaced inward and upward.[2]

Survey of cases

A survey was made of cases of congenital talipes equinovarus seen in the Orthopedic Out-Patient Department at the Detroit Osteopathic Hospital over a period of 3 years, extending from January of 1953 to January of 1956. Available information from the records includes the sex, diagnosis, age of the infant at the start of treatment, type and length of the first stage of treatment, and the results of the treatment as last seen in the Out-Patient Department. Follow-up treatment after the first stage of therapy was usually carried out in the individual physician's office; consequently, results of the second and third stages of treatment were not available for this study. The material from the survey has been summarized and presented in Table I.

There were 33 cases of talipes equinovarus treated in the 3-year period. Twenty-nine (88 per cent) were males and four (12 per cent) were females, indicating an abnormal distribution between the sexes. All recorded series of clubfeet show approximately a 2 to 1 male predominance.[1] Further examination revealed 55 per cent unilateral involvement and 45 per cent bilateral involvement, thus giving the usual unilateral predominance. The infants' ages at the time treatment commenced ranged from 2 days to 3 months, with an average of 20 days. The time needed to overcorrect the deformity by casting ranged from 1 to 8 months, with an average of 5 months. The results at the end of this first stage of treatment proved satisfactory in all but 4 cases, which required further correction by surgery. In these 4 cases there was an inadequate correction of the equinus deformity which required a tenotomy of the Achilles tendon.

Treatment

The treatment is divided into three stages: Correction of the deformity, preservation of the correction, and observation for recurrence of the deformity.[3] This paper will discuss primarily the first stage of treatment, because material available from the survey extends only to the end of the first stage. The discussion of treatment which follows describes that which is commonly performed in the Orthopedic Department at the Detroit Osteopathic Hospital. It is understood that there may be individual variations among surgeons in the Department.

The first stage of treatment is carried out on a hospital outpatient basis. Early treatment must be considered and emphasized; consequently, the surgeon often applies the first cast prior to discharge of the infant from the nursery after birth. The patient undergoes an extensive physical examination, with particular attention given to common signs indicating an acetabular dysplasia, or a subluxation or dislocation of the hip. X-rays of the pelvis are taken if a pathologic condition in the hip is suspected.

The steps of correction are as follows: Correction of the adduction, correction of the inversion, and correction of the equinus.[4] The forces of the first casting are applied on the medial side of the first metatarsophalangeal joint and the medial side of the heel, correcting the adduction of the forefoot and varus of the heel. The physician must be especially careful during the casting stage not to overcorrect the calcaneus into a valgus position. Forces to the navicular are directed downward and outward to align properly the navicular in front of the talus. Adduction of the forefoot will return on weight bearing if this has not been completed. With subsequent cast changes, the adduction and inversion are further corrected until the forefoot assumes an abduction and eversion position. There must be molding of the plantar surface on the medial side to preserve the longitudinal arch. Not until the tarsal bones are properly aligned and the forefoot has been corrected, preferably confirmed by x-ray, is the equinus correction started. The force is directed upward at the

anterior end of the calcaneus and lateral border of the foot. If the force is applied anterior to this point, the forefoot will dorsiflex and leave the heel in equinus, producing the so-called rocker bottom deformity. Casting continues until the three components are completely overcorrected.

The materials used are stockinet, Webril, and extra-fast Johnson and Johnson plaster of paris. With the introduction of Webril, stockinet is now omitted by some of our physicians. Webril replaces sheet wadding in our Orthopedic Department and simplifies and improves the technic in casting of clubfeet because of two physical characteristics: first, it can be snugly applied without tearing; second, it will stick to itself and not to the skin. The extra-fast plaster of paris sets in 2 to 3 minutes, reducing the time necessary for maintaining the corrective forces.

The desired pressure is carefully applied to the foot, and Webril is then wound snugly and smoothly in a circular fashion from the knee to the toes. Two layers may be used over the bony prominences and pressure points. With the desired correction being maintained by the Webril and the leg stabilized by an assistant, the extra-fast plaster is easily applied in a circular manner from the knee to the toes. Then the desired molding and further correction, if necessary, may be made while the plaster is setting. Precaution is exercised in order not to form a tourniquet with the plaster and pressure points by indenting the plaster. The infant is not released to the parents until the surgeon is confident that no circulatory embarrassment is taking place, as evidenced by the condition of the toes.

A complete educational program is given to the parents on the first visit. If parents understand the deformity, prognosis, type of treatment, and time needed for correction, the physician more readily accomplishes the desired result. Particular emphasis is placed upon the immediate care of the infant by the parents. First, complete descriptions of cyanosis, pallor, or swelling of the toes are given and designated as the cardinal danger signs. Upon their recognition, the infant must be brought immediately to the hospital for removal of the cast by the intern on duty, or it may be removed at home by soaking it in water. Next, if the cast slips down so that it hides the toes, it must be replaced immediately. Also, parents are instructed to call on the following day and give a complete description of the cast and the condition of the toes.

TABLE I—SURVEY OF 33 CASES OF TALIPES EQUINOVARUS

Case Number	Sex		Unilateral involvement	Bilateral involvement	Age at time of first casting*	Age at time of last casting†	Results of first stage of treatment	
1	M		X		42 days	6 months	Good	
2	M			X	28 days	8 months		Poor‡
3		F	X		3 days	3 months	Good	
4	M		X		2 days	2 months	Good	
5	M		X		84 days	7 months	Good	
6	M			X	5 days	1 month	Good	
7	M			X	2 days	2 months	Good	
8		F		X	28 days	6 months	Good	
9		F		X	2 days	7 months	Good	
10	M		X		14 days	6 months	Good	
11	M			X	7 days	5 months	Good	
12	M		X		3 days	4 months	Good	
13	M			X	14 days	5 months	Good	
14	M			X	28 days	3 months	Good	
15	M			X	28 days	6 months	Good	
16	M			X	3 days	4 months	Good	
17	M		X		7 days	4 months	Good	
18	M			X	28 days	6 months		Poor‡
19	M		X		14 days	5 months		Poor‡
20	M		X		48 days	4 months	Good	
21	M			X	3 days	6 months	Good	
22	M			X	14 days	6 months		Poor‡
23	M			X	21 days	5 months	Good	
24		F	X		21 days	6 months	Good	
25	M		X		21 days	4 months	Good	
26	M		X		3 days	4 months	Good	
27	M		X		28 days	6 months	Good	
28	M		X		84 days	6 months	Good	
29	M		X		28 days	4 months	Good	
30	M		X		14 days	6 months	Good	
31	M		X		4 days	6 months	Good	
32	M		X		3 days	4 months	Good	
33	M			X	48 days	8 months	Good	
Totals	29	4	18	15			29	4

*Average, 20 days
†Average, 5 months
‡Surgery required

The infant is brought back 1 to 2 weeks after the first casting, and the cast is removed by cutting down the lateral side of the leg and foot. Examination for pressure points is made, and the progress of treatment is noted. The skin is cleansed with baby oil, the excess being wiped off. The second cast is applied, making further corrections. Casts are changed every 1 or 2 weeks until an overcorrection is obtained, which indicates successful completion of the first stage of treatment.

The child is usually seen in the physician's office for the second and third stages of treatment. The correction must now be maintained, and this is done by the use of the Sabel prewalker shoe which may be attached to a Denis Browne bar for correction of the internal tibial torsion often accompanying the clubfoot deformity. At the walking age the infant is placed in one of three types of shoes: straight last shoe, clubfoot shoe, or tarsopronator shoe. The longitudinal arch support and lateral sole wedge may be added, if necessary, to correct pronation and toe-in while walking. The Denis Browne bar may be left on at night if the tibial torsion persists. Continuation of this treatment until the age of 3 or 4 years, with frequent checking for the recurrence of the deformity, constitutes the third stage of therapy.

Summary

This paper surveys the first stage of treatment in 33 cases of talipes equinovarus. The average age of the infant when casting was started was 20 days. The average time that casting was needed to produce overcorrection of the deformity was 5 months. Four cases required surgery to complete the correction. The technic of applying the corrective plaster of paris cast was described.

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Orthopedic problems in METASTATIC CARCINOMA

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CARCINOMA that has metastasized to bone is a problem that will confront the orthopedist frequently in his practice. This may be encountered as a pathologic fracture or as a painful syndrome in the low-back or dorsal region of the spine. Treatment directed to the bone lesion will be presented later in this discussion, both local mechanical therapy and the over-all systemic approach to the disease affecting the osseous system. A review of the nature of the process is in order as an introduction and basis for the proper perusal of the problem.

Classification

Ten per cent of all types of carcinoma develop bone metastases.[1] The major primary sites of the cancer which produces osseous metastases are considered to be the prostate, lung, kidney, breast, and thyroid. This list is in order of frequency, according to Weinmann and Sicher.[2] Coley[1] lists carcinoma of the breast as being the most frequent origin of metastases to the skeletal system, with the prostate second, then thyroid, and finally kidney. A study of metastatic tumors of the vertebral column seen at the State University of Iowa Hospitals in 1948 showed the following occurrence pattern:[3]

Carcinoma of the breast	32
Carcinoma of the prostate	7
Hypernephroma	3
Ewing's tumor	1
Chondrosarcoma	1
Bronchogenic carcinoma	1
Carcinoma of the skin	1
Carcinoma of the rectum	1
Carcinoma of the cervix	1
Fibrosarcoma of the cervix	1
Osteogenic sarcoma	1
	50

This statistical survey included all metastatic lesions and was not restricted to carcinoma, but it bears out the criteria set up by Coley[1] in his classification of ossophile carcinomas (breast, prostate, thyroid, and kidney) and ossophobe carcinomas (skin, oral cavity, esophagus, cervix, stomach, and rectum).

Disease process

The spread of carcinoma to bone from a primary site is by direct extension of an overlying soft tissue tumor, by blood stream, and finally by retrograde lymphatic channels. Blood stream metastases may inaugurate a lesion in any bone, although they are rarely seen below the elbow or knee. The spine, pelvis, and upper femora are the most likely sites of osseous metastases, because these sites are less dynamic than the distal

extremities and thus present a better local situation for the retention of carcinoma cells. The blood flow is slower, and cells are retained in the spongy cancellous bone. Metastasis is rare in cortical bone. Lymphatic spread affects bones closest to the primary site: ribs, dorsal spine, and skull in carcinoma of the breast; and pelvis, sacrum, and lumbar spine in carcinoma of the prostate. Metastasis to the vertebral column from pelvic tumors depends upon the entrance of tumor-celled emboli directly into the vertebral venous system, bypassing the lungs. Borak's[5] principle of the biology of bone metastases is that very slow growing carcinomas of certain histologic structure metastasize to bone without affecting viscera.

There are two basic forms of skeletal metastases: osteolytic and osteoblastic. The former is usually the type of lesion seen roentgenologically with carcinoma of the breast, thyroid, and kidney, with bronchogenic carcinoma, and occasionally with gastrointestinal carcinoma. The osteoblastic lesion is typical of carcinoma of the prostate. This is actually a radiographic interpretation and does not represent the true pathologic process, since there is no basic histologic difference in the host bone.

The effects of carcinoma on bone are summarized in an excellent fashion in a recent article by Milch and Changus.[6] Their conclusions, based on microscopic study of 241 autopsies, are as follows:

1. Bone metastases are blood-borne. Once established in a bone, further spread of the metastasis occurs at first within the bone along such preformed anatomic channels as the medullary cavity, and the Volkmann and haversian canals. After this, or frequently at the same time, interosseous permeation by tumor takes place.

2. Bone destruction results from a direct mechanical pressure exerted by the tumor cells and/or from a physiochemical process at the bone surface, promoted by the tumor cells, which destroys the normally continuous layer of cells covering and lining the surfaces of the bone crystals.

3. Bone production is an attempt by the host bone to repair injury caused by cancer invasion. It has not been shown that any abnormal substance is responsible for this aspect of repair phenomena.

4. There is no essential histologic difference, insofar as the host bone is concerned, between the "osteolytic" and "osteoblastic" cancer metastases; the distinction is quantitative. Qualitatively, the histologic appearance of predominantly destructive and predominantly productive cancer metastases are identical, and bone responses differ in degree and not in kind. The histologic details in any given cancer metastasis in bone can be considered as mechanical, based on the amount of new bone formed as a "stromal response" to the invasion.

5. The histologic grade of the bone response represents morphologically the results of two biological-rate phenomena: the rate of bone destruction and the rate of bone repair. An increased rate of tumor growth and the consequent increased rate of bone destruction are radiographically represented as an "osteolytic" lesion. When the rate of bone repair is greater than the rate of destruction, the resulting lesion appears roentgenographically as "osteoblastic."

6. Progressive roentgenographic opacity of a cancer metastasis in bone indicates bone repair, regardless of the site of the original neoplasm. Osteoblastic metastasis from carcinoma of the prostate gland and roentgenographically osteoblastic metastases from any other site of origin represent instances of bone repair and not of "progression of disease."

7. The age and endocrine status of the patient are relevant only as concern the rate of tumor growth. In patients with neoplasms known to be affected by endocrine therapy, there is generally a direct correlation between the histologic grade of bone response and the antemortem clinical findings.

There does not appear to be much question that the basic osseous lesion is destructive or osteolytic in every case, and the presence of an osteoblastic reaction is the result of the surrounding connective tissue and not from the stroma of the carcinoma proper. The reason this osteoblastic lesion or characteristic is seen so frequently with cancer of the prostate, infrequently with cancer of the breast, and rarely with thyroid and kidney is explained by Weinmann and Sicher[2] as a phenomenon related to the high content of acid phosphatase in metastatic carcinoma of the prostate. They also state that epithelial cells of the urinary bladder transplanted into connective tissue induce heterotopic formation of bone.

When both osteoblastic and osteolytic lesions are seen in the same patient, it is usual for the osteolytic lesions to be in the skull and extremities. Osteoblastic lesions are far less prone to be the site of pathologic fracture. They are more likely to remain localized, their growth is slower, and with them there is a longer life expectancy. The latter three points are particularly true if the primary site is the breast, with the occasional presence of a so-called blastic lesion of bone. An osteoblastic reaction is seen after x-ray therapy in cases of osteolytic metastases, and it is indicative of destruction of carcinoma cells.

An essential point to mention is the possibility of osseous metastases without radiographic evidence.[7] Radiogallium (Ga^{72}) was suggested[8] for the detection of bone metastases before their appearance on roentgenograms. Twenty times more radiogallium is deposited in bony metastases than in normal bone; this has been checked in 12 cases. The use of bone marrow aspiration (sternum and ilium) to pick up metastatic cells of prostatic carcinoma proved[9] effective in 19 of 57 patients. Of these 19 patients, 5 showed no x-ray evidence of metastasis. In this series, alkaline phosphatase was elevated in 17 of the 28 with osseous metastasis and acid phosphatase in 15 of the 28.

Treatment

A more practical aspect is the consideration of what to do for the patient. The approach of the orthopedist should be optimistic and aggressive. Actual cure of the patient is unusual, but a more comfortable and useful life can be made for him with proper thought and action.

Therapy consists of one or more of the following: (1) local therapy of surgical or supportive nature (open reduction, internal fixation, external skeletal fixation, casts, and braces); (2) local x-ray therapy; (3) systemic hormonal and steroid treatment; (4) surgical or radiologic sterilization or castration; (5) systemic radiotherapy through the use of certain radioactive drugs; and (6) supportive measures in the form of high protein diet, adequate calcium intake, vitamins, and analgesics. Infrequently neurologic procedures such as chordotomy or decompressive laminectomy are indicated. Platt[7] mentions the fact that occasionally amputation or excision of a solitary tumor is justified if the patient is suffering excruciating pain.

The major problems confronting the orthopedist are skeletal pain and pathologic fracture.

McLaughlin[10] expresses a definite preference for open reduction of pathologic fractures with intramedullary fixation. He feels that this is the wisest choice in fractures of the femur and humerus, which are the most frequent sites of pathologic fractures aside from the spine. The advantage of internal fixation is that although the outlook is hopeless for life, morbidity is reduced. The fracture will heal in a certain number of cases, although there is always the danger of refracture if an intramedullary nail is not used. A report[11] from the University of Pennsylvania Hospital concerning a series of 50 cases of pathologic fracture revealed that 22 per cent healed. This fact indicates that nailing is superior to the use of casts for fractures of the humerus and femur which result from metastatic lesions. The frequently cited risk of producing a fungating mass at the site of surgery is usually minimal, because of the lack of soft tissue involvement at the time of fracture. In McLaughlin series, this did not occur.

If the patient or his family refuses surgical intervention, simple casting or splints can be used to eliminate motion of the fragments and thus reduce pain. External skeletal fixation has been used by some, but it has the disadvantage of creating permanent sinus tracts while the device is still in place. I do not believe that it compares with intramedullary nailing or plating in the operative treatment of the metastatic osseous lesion with fracture. Intramedullary nailing can also be considered as a prophylactic procedure where a large osteolytic lesion is seen in the femur or humerus, prior to actual occurrence of fracture. Fracture or compression phenomena of the spine can be adequately treated with body cast or full spinal brace to stabilize the area and prevent further collapse of the involved vertebrae. Support of the spine is particularly indicated during roentgen or hormonal therapy for metastatic cancer of the vertebrae.

Local roentgen therapy of the metastatic osseous lesion, with or without fracture, is of palliative value. It will have a beneficial effect in decreasing the pain. In most instances, the effect of irradiation is not striking in stimulating bone repair or healing fracture.[1] In my own experience, local radiotherapy has been requested in every case of osseous metastasis. One word of warning in this respect is the fact that postradiation sarcoma does develop in bone. A study[12] of seventeen cases of postradiation sarcoma of bone encountered at the Mayo Clinic revealed that three cases developed in previously normal bone. There is no question that the incidence of this complication is small, and the life survival of the patient with metastatic cancer is not great, yet it would be most pathetic if such an entity should develop in a patient with a slow-growing metastatic cancer, who has been fairly well maintained with therapy up to that time. The advisability of radiotherapy should be discussed with the radiologist, and it should be upon his recommendation and under his direct supervision that the therapy is ordered.

Hormone therapy has shown definite value in the treatment of metastatic carcinoma, particularly if the site is the breast or prostate. With skeletal lesions from breast cancer, androgens are indicated in any stage of life. Estrogens are sometimes used in postmenopausal women, but do not have the same beneficial effect on osseous lesions, although they do cause soft tissue lesions to regress. Androgens are given in 50 to 100 mg. doses, three times weekly. This is continued for 2 to 3 months, since it takes that long for the beneficial effects to become manifest. If after this period there is no apparent improvement either subjectively or objectively, the treatment is discontinued. If the disease is improved or stationary, the therapy should be discontinued and reinstituted if the lesion begins to show unfavorable progress. It is also advisable to switch to the opposite steroid if there is continued lack of favorable progress with the initial hormone of choice, for example substituting estrogen for testosterone proprionate.[13,14] With androgen therapy, there is the possible complication of extension of the osseous lesion, particularly if the patient is confined to bed.[1,14] Also there may be a hypercalcemia, which can be treated with intravenous sodium citrate.[14] X-ray therapy is very often used in conjunction with the steroids.

In 1952, a report[15] was presented in which testosterone proprionate was used in the treatment of low-back pain caused by metastases or adenocarcinoma of the thyroid. The patient was a bedridden invalid who had not responded to any previous therapy. There was dramatic relief of pain with recalcification of the osteolytic lesions. Since testosterone proprionate has a stimulating effect on bone metabolism, it may be indicated in the palliative treatment of osseous metastases from primary carcinomas arising from sites other than the breast.

Estrogens are definitely indicated in the metastases from carcinoma of the prostate. Coley[1] reported that 90 per cent of all cases are benefited by steroid therapy, which is usually given as stilbesterol by mouth. Pain is diminished or eliminated, and there does not appear to be further progress of the osteoblastic lesion.

Sterilization and castration by surgical means have also been used effectively to help control metastases of breast and prostatic carcinoma. Ovarian sterilization in cases of breast carcinoma produces fill-in of eroded and lytic zones. Coley[1] holds that ovarian sterilization is indicated only in breast cancer with osseous manifestations, and his recommendation is for roentgen sterilization with 2400 roentgens. Nathanson[14] recommends ovariectomy in younger women for osseous metastases. He claims definite regression of symptoms and objective findings with this procedure. Pelvic radiation favorably effects healing and inhibits the formation of skeletal metastatic lesions from the breast.

Surgical castration in the male is routine for carcinoma of the prostate, because of its known beneficial effects on the primary disease process and its inhibiting effects on extension into bone.

The efficacy of radioactive drugs has been questionable except for radioactive idoine (I^{131}), which has had beneficial effects on skeletal metastases from certain forms of properly treated thyroid carcinoma, that is, thyroid cancer in which there is a good uptake of radioactive iodine and the primary lesion has been ablated, either with radiotherapy or surgery. Radiogallium has been described in one article[8] as beneficial in metastatic carcinoma of the bone, but I have not read anything further in respect to this treatment, nor has questioning radiologists and oncologists on this modality brought forth any further information relative to its use. In the article in question, radiogallium is said to reduce the pain of the bone lesion.

Treatment also includes adequate control of pain when other forms of therapy described do not alleviate distress. This treatment may vary from simple analgesics to narcotics. I have used cobra venom to ease pain with variable results. Chordotomy may have to be considered in those cases of intractable pain which do not respond to simpler measures.

Conclusion

A brief resume of the problem of skeletal metastases, from the biologic and therapeutic standpoints, has been presented. It is my opinion, along with others, that a do-nothing attitude is uncalled for. Patients can be helped with a decrease in morbidity and suffering, and in some cases a prolongation of life.

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THE BONE GRAFT

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THE PROBLEM OF PERFORMING a successful bone graft is one which has held the interest of surgeons and research workers for many years. Continuous experimentation and study have been carried on until at the present time the technic of bone grafting has become another of the fundamental operative procedures of orthopedic surgery.

Historical background

In reading back through the literature, it becomes evident that present day methods and concepts are the result of over 250 years of research on the problem. According to Bick,[1] Salmon, in 1697, replaced large splinters of a bone after it had been shattered by gunshot, "that they might be joined together by callus." The grafting of animal bone (heteroplasty) to replace bone defects in the human skeleton has been attempted with very poor results since the earliest stages of surgery.

In 1880, Macewin resected the shaft of a humerus and inserted small chips of human bone beneath the periosteum. These grafts took and a new shaft was formed. This was the first recorded successful homogenous bone graft surgery.[1]

In 1911, Albee developed the type of bone graft surgery that we know today by introduction of his newly developed technic in which an autogenous bone graft was transplanted to a bed of cancellous bone in a one-stage operation. As his experience increased, he improved his technic and at the same time developed the electric saw and many other instruments which are still in use in bone graft surgery. His book, "Orthopedic and Reconstruction Surgery,"[2] which was published in 1919, was the "bible" of orthopedic surgeons for many years. In going through this book today, it is interesting to note how many of the technics described are still in use.

The fate of the bone graft has been a matter of speculation for many years; even now it is a question in the minds of research workers. In a careful review of the literature, Chase and Herndon[3] state that in 1739 Duhamel began his recorded experiments on the problem of osteogenesis. At this time he placed silver wires subperiosteally, and when examining them weeks later, found that they were covered with newly formed bone. From this experiment he concluded that this new bone was produced through the osteogenic property of the periosteum.

In 1836, Heine totally resected ribs subperiosteally, and when full regeneration of the ribs was found, he added his writings to those of Duhamel to support the theory that periosteum was osteogenic. This theory received further support and impetus in 1842 when Flourens reported further experimental evidence that periosteum was the chief factor in the healing of bone defects.[3]

All of this research work stimulated arguments pro and con until 1907 and 1909 when Axhausen, after exhaustive and scientifically planned experiments, reported that periosteum has pronounced osteogenic properties. These properties are most marked in autografts, less marked in homografts, and practically nonexistent in heterografts. He further stated his belief that all transplanted bone dies, but that most of the periosteum survives and is the source of active osteogenesis. It is very interesting to note that these views are generally accepted today. Chase and Herndon[3] report, after a review of 1,500 articles, that present-day knowledge of the histologic fate of bone following transplantation is but little changed from the views originally presented by Axhausen.

Use and types

Following are the conditions in which bone grafts are used: (1) to promote union, provide fixation, and fill defects in delayed union, malunion, fresh fractures,

or osteotomies; (2) to eradicate cavities or defects from bone cysts or tumors; (3) to establish union in pseudarthrosis; (4) to bridge major defects in or to re-establish the continuity of a long bone; and (5) to bridge a joint and thus provide arthrodesis.[4]

Bone grafts are composed of cortical bone, cancellous bone, or a combination of the two. Cortical bone provides fixation, while cancellous bone provides osteogenesis. In planning the use of a graft, the surgeon should always bear these properties in mind and choose his graft accordingly.

Grafts are autogenous when the patient is his own bone donor. If the graft is taken from another human being, it is known as a homogenous graft, while the graft taken from another species is known as a heterogenous graft. Autogenous grafts are generally removed from the tibia, fibula, rib, or ilium. The tibia provides cortical grafts, the fibula and rib the whole bone transplant, and the ilium the cancellous graft.

Until recent years the tibia has been the principal donor site but experience has changed this because of the following disadvantages connected with its use: (1) removal of the graft from the tibia adds to the length and magnitude of the surgical procedure; (2) hospitalization and convalescence are prolonged, and ambulation must be delayed until the defect in the tibia has become partially healed; and (3) the tibia must be carefully protected for from 6 months to a year to prevent its fracture. However, it is possible to remove the proximal two-thirds of the fibula without materially disabling the leg. The proximal end of the fibula is so shaped that it is an ideal transplant for the distal end of the radius or fibula.[4]

The rib forms an excellent graft for the mandible and is used in many reconstructive procedures in plastic surgery. As stated before, if removed subperiosteally, it regenerates almost completely.

Cancellous bone is generally obtained from the ilium and fulfills all the requirements of a bone graft with the exception of strength. Cancellous bone grafts unite with the host bone much more rapidly than do cortical grafts. This cancellous bone can be obtained from the ilium as multiple slivers, or chip grafts, or the outer cortex can be removed along with the necessary amount of cancellous bone to give a combination of types of graft. If only cancellous bone is required, a small window can be cut in the cortex of the ilium and a large curette used to remove the necessary amount. A small amount of cancellous bone can also be removed from the proximal end of the tibia in the same manner.

A homogenous bone graft is also known as a syngenesioplastic graft if the donor is a relative of the patient. This type of graft has been used to good advantage in small children whose donor sites were too small to provide large enough cortical grafts to bridge defects properly or to produce enough cancellous bone to eradicate a large cavity or cyst, or where there is a possibility of injuring an epiphysis with resultant growth disturbance or deformity. In children, the homogenous graft is usually removed from one of the parents. Blood type or Rh factors do not interfere with the use of homogenous grafts, but the donor should be checked very carefully for malaria, malignancy, tuberculosis, and syphilis.

Heterogenous bone grafts are those which are taken from some other species to replace defects in the human skeleton. This particular type of grafting has been attempted almost from the beginning of surgery. Although the results obtained from the use of heterogenous bone have been very poor in comparison with those obtained from the autogenous and homogenous bone, experimental work along this line is still being carried on. Interest in the heterogenous bone graft has increased since the advent of the bone bank.

In 1949, Judet, Judet, and Arviset[5] found that frozen calf bone could be used with results comparable to those obtained from frozen human bone. In 1953, Guilleminet, Stagnara, and Dubost Perrett[6] reported a series of 80 cases in which frozen calf bone was used, with only 10 per cent failure. Terhune and Shannon[7] reported 27 major bone graft cases, with 20 per cent nonunion.

Recently, E. J. Tucker[8] has conducted an exhaustive study on the use of heterogenous grafts of calf bone stored in bovine plasma, with some very interesting and encouraging results. He states:

> Since the bone bank has become such a necessary adjunct to orthopedic surgery, more interest is present in this material for several other well-recognized reasons: (1) orthopaedic procedures are greatly simplified; (2) this bone is available at all times; (3) there is freedom from danger of syphilis and from a hepatitis virus contamination; (4) the material is obtained immediately after death; (5) there is no legal question involved in obtaining the bone.

Tucker obtains calf bone under sterile conditions and stores it in 20 per cent bovine plasma in physiologic saline. One million units of pencillin and 2 grams of streptomycin are added to each liter of the solution. This is then sealed and stored at 40 F. for 14 days, then tested with anaerobic and aerobic media and by guinea pig inoculation. If sterile, the bone is then changed to a fresh plasma solution and a final culture is made of this solution. Tucker claims only 5 contaminations out of 150 cultures.

All patients on whom this type of bone graft is to be used are given a sensitivity test prior to surgery. However, this type of graft should be withheld only from patients with a strong sensitivity reaction. Since the storage solution contains penicillin G and streptomycin, patients should also be checked carefully for any history of allergy to these drugs. Before use, the graft should be put through several washings of normal saline solution to safeguard against reaction.

Tucker[8] states that by preserving calf bone in bovine serum at a low metabolic temperature it was found experimentally that:

1. Bone cells remain intact for long periods.
2. Unorganized elastic and collagenous fibrous proliferation takes place on the cut surface of the bone.
3. Little alteration of bone structure occurs.
4. Freezing destroys the bone cells and alters structure.
5. No untoward reaction occurs between human bone preserved in human plasma and calf bone, and no untoward reaction occurs between calf bone preserved in bovine plasma and human bone.
6. Marked reaction does occur between frozen human bone and calf bone.
7. Heterogenous bone preserved in plasma unites with greater rapidity than frozen bone.

His clinical results in 22 cases in which he used cultured calf bone grafts were:

1. No reaction took place between cultured calf bone grafts and those of human beings.
2. Only 1 case of nonunion occurred in this series; this was an instance of posterior bone bloc in which the graft was separated from its bed by trauma.
3. Clear, serous drainage was observed in 2 cases in which unusually large grafts were used. Both of

these healed spontaneously, and the serous drainage did not interfere with the union of the graft.

4. No postoperative infections occurred.

His conclusion that cultured calf bone was satisfactory as a bone graft was for the following reasons:

1. Unlimited quantities of cultured calf bone can be made available.

2. Storage and transportation problems are at a minimum.

3. There is no danger of latent syphilis or a hepatitis virus transmission.

4. The sterility of the bone graft is more sure, since there were no postoperative infections in this series of 22 cases.

5. Cultured calf bone encourages early union, and no heterogenous bone reactions have been observed, even with use of large quantities. While this series of 22 cases is small, I am of the opinion that Tucker may have laid the foundation for considerable improvement in the use of the bone bank and heterogenous bone grafts.

Repair process

Most research workers are of the opinion that a bone graft does not live after its transplantation. They do agree that within a few weeks vessels grow into the graft from the transplanted and host periosteum as well as from the host bone itself.[9] These vessels are accompanied by periosteal and endosteal osteoblasts which transform the dead bone of the graft into living bone. The superior osteogenic qualities of cancellous bone arise from the extensive endosteal surfaces and the numerous accommodation spaces which allow early revascularization and osteogenesis. The best results are obtained by using autogenous periosteum and endosteum covered grafts, by the early establishment of the interrupted circulation of the graft, and by complete and prolonged immobilization of the grafted part.[4]

Although grafts aid greatly in the reactivating process of bone repair, they cannot maintain the stability of the fracture indefinitely and will eventually fracture unless the fragment ends unite by end-to-end endosteal and periosteal callus. Therefore, after removal of the cast, the extremity must be protected by means of a brace until there is conclusive x-ray evidence of complete union.

Selection of patients

Before applying the graft, careful evaluation of the condition of the soft parts over the defect in the bone is as important as the evaluation of the bone to be grafted. The primary conditions necessary for a successful graft are vascular host bone and soft tissue investment. Avascularity and infection are the two most common causes for the failure of a bone graft operation. The presence of an active infection or of a draining sinus, even of a low-grade type, contraindicates any type of a grafting procedure. Extensive scar formation of the skin and deep tissues is another condition which has to be eliminated before an attempt at bone grafting is made. Care should also be taken to remove all local inhibiting factors such as separation of the fragments, interposition of scar tissue, and the sealing off of the medullary canals at the ends of the fragments. After all of these factors have been eliminated, the mechanical fixation and the stimulation of osteogenesis by the bone graft will hasten the reparative process of callus formation.

Operative technic

Types of grafts vary according to the types of fracture involved.

The single onlay cortical graft is the simplest and most effective procedure for treating most ununited diaphyseal fractures. The cortical bone is usually supplemented by cancellous bone for osteogenic purposes. This type of graft was first developed by Henderson and later modified by Campbell, who wished to develop a graft which would give absolute fixation and at the same time promote osteogenesis.[4]

The single onlay cortical graft is applicable to the treatment for nonunion of the shaft of any long bone. The host site is prepared by removing a portion of the outer cortical layer to provide a flat surface the width of the graft and 3 to 4 inches of length on each fragment of the host bone. The graft is secured in position by the use of screws, and cancellous bone from the donor site is placed around the fracture site. Fixation must be strong enough to prevent motion at the fracture site.

The essentials for a good onlay graft are: (1) a good raw-bone bed; (2) firm mechanical fixation; (3) placement of the graft so that there is no tension on it; and (4) healthy tissue and skin over the graft.

The dual onlay graft is especially suited for use near a joint because of its forceps-like action. This results in relatively good stability in an area which is hard to immobilize. The use of this type of graft is also indicated in the case of osteoporotic bone. It is a good type to use in briding defects since the two grafts give a better mechanical fixation than that obtained by the use of the single onlay graft. The two grafts not only add strength and stability, but also form a trough into which cancellous bone can be packed. Neither the single nor the double onlay graft is as popular as it once was. Although 92.8 per cent healing was reported with this type of graft at one time, it is now suggested that a whole fibular graft can be used to better advantage in the upper extremity than either type of onlay graft.[4]

The inlay graft, while not as popular as previously, is still useful in certain cases for the treatment of nonunion, where splinting as well as osteogenesis is needed. This graft should consist of all three elements of bone: periosteum, endosteum, and cortex.

There are many variations of the simple inlay graft. The most common is the sliding inlay graft, in which a long fragment of the graft is slid down over the fracture line and the short fragment is placed in the opposite end of the trough. The graft is then fixed with metallic screws.

Gallie and Lemesurier[10] cut a large diamond-shaped segment 4 to 5 inches long from both fragments of the fractured bone, with the wide central portion at the fracture line. A graft of a slightly larger size is removed from the tibia and wedged into place. However, fixation is difficult to maintain with this type of graft.

Whole fibular shaft grafts are used to bridge defects in the radius or ulna. The tubular structure of the fibular shaft is much stronger than a tibial graft with an equal amount of cortical bone. The fibular graft does not increase the size of the forearm so the wound is easily closed without tension. As stated before, two-thirds of the proximal end of the fibula can be removed without materially disabling the leg. The proximal end of the fibula is so shaped that it is an ideal transplant for the distal end of the radius, and it can be used for the distal end of the fibula as well.

In 1931, Gibson[11] devised a tibial graft with clefts at each end to grasp the under spinous processes of the proximal and distal ends of the fusion area of the spine. Later Bosworth[12] devised the double clothespin or "H" graft, taken from the ilium especially for lumbosacral fusions. This graft is reinforced with strips of cancellous bone. By flexion of the lumbosacral spine at the time of the insertion of the graft, the degree of lordosis is reduced, the lumbosacral joint is wedged open, and the lumbosacral articular facets are restored to a more normal relationship with an increase in the lumen of the intervertebral foramen. In using this graft, it is important that the laminae be denuded and cortical bone packed around the entire area.[13]

It is my practice to place the patient in an extension cast several days before surgery, and then bivalve the cast and prepare it for reapplication immediately after surgery. The patient is kept in this cast for 8 weeks, after which he is fitted in a Jewett brace, which is worn until radiographic studies show that the graft is solid. I use the "H" type of graft more than any other.

117 W. Third Ave.

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Treatment of vertebral body COMPRESSION FRACTURES

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IT HAS BEEN ESTIMATED by Watson-Jones[1] that approximately 80 per cent of vertebral fractures are simple and recovery is to be expected. Key and Conwell[2] estimate that 50 per cent of vertebral fractures are of the simple compression type and involve the vertebral body only.

It is the intent of the following discussion to present a method of handling vertebral compression fractures which I feel is superior to the two extremes of treatment—on the one hand, that of bed rest and inadequate immobilization in a Taylor or similar type brace and, on the other hand, the cumbersome method of immobilization for a prolonged period in a plaster body cast.

By way of review, compression fractures of the vertebral bodies are usually the result of hyperflexion injury which occurs when the patient falls from a height and alights on his feet or buttocks, or when he is struck on the shoulders or upper thoracic area by a heavy falling object. The compressing force fractures the upper vertebral plate with resulting decreased anterior marginal depth ranging from a minimum to 50 per cent or more.[1]

Approximately 70 per cent of the fractures occur at the lumbodorsal junction, involving the twelfth thoracic and/or first lumbar vertebra. The fifth lumbar vertebra is less frequently injured, and is involved in acute flexion injuries in the lower lumbar area.[2]

It should be stated that when vertebral fractures occur in patients at the fourth decade or older, the physician should be suspicious of a pathologic condition, especially if only minor trauma is involved. If an underlying bone disease is evident, further steps must be taken to determine the pathologic process present. In these patients, critical x-ray examination and physical examination must be done, along with taking of a complete history. Laboratory examinations should include complete blood count, Kahn test, and urine studies, including Bence-Jones protein and both serum alkaline and acid phosphatase determinations. Spinal fluid Kahn should also be done in all suspected syphilitic infections.

On clinical examination, the most reliable signs indicating vertebral compression fracture are pain elicited on percussion of the spinous processes and appreciable paravertebral muscle splinting about the site of injury. Both anteroposterior and lateral x-ray views of

the entire thoracic and lumbar spine should be taken in all cases where fracture is suspected, because of the possibility of multiple fractures in flexion injuries. Adequate neurologic examination should also be included, evaluating lower extremity reflexes, active muscle function and coordination, and sensory reactions.

The statement, "he broke his back," has long carried with it a serious implication in the minds of both physician and layman. It is true that some fractures and fracture dislocations are serious because of extensive injury to the spinal cord, especially depending on the level of the injury. However, in the great majority of cases, a simple compression injury of the vertebral body is not serious, and it is the surgeon's responsibility to reassure the patient that no spinal cord damage has occurred or is imminent, and that recovery is the rule.

Treatment

Following is an outline of treatment which has been used during the past 3 years in patients with vertebral compression fractures ranging from minor compressions to 50 per cent loss of vertebral body depth.

The patient is placed on a regular hospital bed in the reverse position (the patient's head at the foot of the bed), with the knee lift raised slightly at the point of fracture, thus causing hyperextension of the spine. The hyperextension is gradually increased within the patient's pain tolerance over the next 24 or 48 hours, and gradual reduction of the fracture is acomplished. In the meantime, adequate sedation and analgesia are used to control the patient's discomfort. Urecholine, 5 mg. three or four times daily, and enemas as needed are used to control urinary retention and moderate ileus, which are common complications of these injuries. Hyperextension is continued for 3 to 5 days until the patient can be immobilized in a Jewett hyperextension brace.[3]

At this point, it may be well to describe the difference between the hyperextension type of brace and the ordinary back brace with two upright bars, of the Taylor or Knight type. The principle of the hyperextension brace is the same as that of the plaster body cast, in which 3-point pressure is exerted on the trunk to maintain the spine in a position of hyperextension. It is constructed with padded plates over the manubrium and symphysis which are connected by a vertical bar on either side. Two metallic straps extend over the fracture site through a plastic pad in back and are anchored to either side. When the straps are tightened, 3-point pressure is accomplished.

Jewett[3] states that the hyperextension brace operates on the principle of a bow or seesaw, so that when the patient wearing this brace bends forward or sits down, there is no alteration in the hyperextension of the spine because firm metal fixation holds the symphysis, the sternum, and the lumbar portion of the spine in their normal interrelations.

The Taylor brace has only one supposedly fixed point, the pelvic girdle; the rest of the spine has to be supported from this one area by the posterior metal bar. Even if the brace is carefully applied, the dorsal part of the spine will almost invariably pull away from the top of the brace when the patient bends forward. Also, the burden of support of the upper part of the spine generally is borne by shoulder straps or pectoral pads, the anchorage again being transmitted down to the pelvic girdle.

With use of the hyperextension brace, the patient is made ambulatory and started on rehabilitative exercises as soon as he is fitted. Exercises include lying in a prone position and hyperextending first the upper trunk and shoulders, and then the lower extremities, with the knees kept straight. The patient also turns to the supine position and does straight leg raising exercises. Gluteal contracting exercises are also done regularly. The importance of rehabilitative exercises in the regaining of good muscle tone and early fracture healing is emphasized.

The brace is worn until there is radiologic evidence of stabilization of the vertebral fracture. At first, the brace is discarded during the early hours of the day and reapplied the latter half of the day when muscle fatigue is more likely to occur. The average duration of immobilization is 6 to 7 months.

Results of treatment

A total of 23 patients was treated by this method over a 2-year period, and results have been generally good in those on whom follow-up has been possible, for a period of 2 years after the brace was removed. A total of 11 males and 12 females was included in the study; the twelfth thoracic vertebra was the fracture site in 7, the first lumbar in 8, the fifth lumbar in 3, and in the 5 remaining, the second, third, and fourth lumbar and sixth thoracic vertebrae. The average time in the brace was approximately 6½ months. Results were considered good in all cases except in one 64-year-old male, who had appreciable hypertrophic lumbar arthritis. One patient was lost to follow-up.

It should be noted that complete anatomic reduction of all the fractures was not accomplished by the gradual hyperextension method as outlined above. However, in the patients treated in this series, after 2 years follow-up, this has not seemed to affect the final result in those

TABLE I—SUMMARY OF 23 CASES

Case No.	Age	Sex	Location of fracture	Length of time immobilized	End result
1	50	F	12th thoracic	7 months	Good
2	78	F	1st lumbar	5 months	Good
3	60	F	12th thoracic	6 months	Good
4	59	M	12th thoracic	6½ months	Good
5	64	M	1st lumbar	6 months	Good
6	60	M	2nd lumbar	6 months	Good
7	60	F	12th thoracic	7 months	Good
8	64	M	4th lumbar	6 months	Fair
9	45	M	1st lumbar	7 months	Good
10	51	M	1st lumbar	6 months	Good
11	63	M	2nd lumbar	6 months	Good
12	65	F	12th thoracic	7 months	Good
13	33	M	5th lumbar	7 months	Good
14	51	F	1st lumbar	6½ months	Good
15	64	M	12th thoracic	Lost to follow-up	
16	70	F	6th thoracic	7 months	Good
17	18	M	5th, 6th and 7th thoracic	5 months	Good
18	67	F	12th thoracic	7½ months	Good
19	65	F	4th, 5th and 8th thoracic and 1st and 5th lumbar	7 months	Good
20	51	F	1st lumbar	10 months	Fair
21	60	F	11th thoracic and 5th lumbar	6 months	Good
22	75	F	2nd and 3rd lumbar	8 months	Good
23	44	M	1st lumbar	8 months	Good

patients who were immobilized long enough and who were faithful in doing the rehabilitative exercises.

I believe there are several advantages in the method just outlined in both reduction of the fracture by gradual hyperextension and immobilization in a Jewett brace. General anesthesia is not needed; immobilization is adequate in a brace which is light and comfortable. The patient can bathe quite satisfactorily with the brace on and most clothing can be easily worn over it.

Summary

A brief review of the mechanism of injury and the diagnosis of vertebral compression fractures has been presented. A simple and effective method of treatment by immobilization in hyperextension with a Jewett brace has been outlined. The advantages of this method have been pointed out, and a series of 23 cases thus treated has been presented in Table I.

117 W. Third Ave.

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NEUROGENIC SARCOMA

Differential diagnosis and treatment, with presentation of three cases

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IT WAS PROPOSED AT first that the topic of this paper be limited to neurogenic sarcoma, but the discussion of any malignancy would not be complete if it did not include a survey of those benign neoplasms simulating it and an evaluation of their malignant potentials.

When considering neoplasms of the peripheral nerves, the term "neuroma" comes to mind, so a review is in order. The terms "traumatic," "amputation," or "false" neuroma apply to the proliferative mass of Schwann cells with mesodermal elements and neurites that develops at the proximal end of an injured nerve. It is a response to trauma, but not a true neoplasm. "True" neuromas, which are very rare, are composed of coiled masses of axis cylinders of varying size, invested with their membranes. It is thought by many investigators[1] that these rare "true" neuromas may be developmental defects. The development of a true neoplasm from either type of neuroma has not been recorded.

The most frequently seen benign neoplasm arising from a peripheral nerve is either a neurilemmoma or a neurofibroma. Authorities agree that the neuroectodermal Schwann cell is the most active participant in either of these tumors.[2,3] A brief resume of these two benign tumors of the peripheral nerves is essential for a better understanding of the neurogenic sarcoma.

Neurilemmoma

Synonyms for this neoplasm are many and include neurinoma, schwannoma, perineural fibroblastoma, peripheral glioma, and specific nerve sheath tumor. In 1910, Verocay[4] first described the histology of this tumor and named it "neurinoma," mistaking the presence of many parallel fibers for neuraxonus.

Neurilemmoma is a specific tumor, arising from the Schwann cells forming the sheath of a nerve which is derived from the neural crest, and hence is ectodermal in origin. It may form in peripheral, cranial, or sympathetic nerves. Those tumors involving the extremities are most commonly found on the flexor aspect, where the large nerve trunks are present. They tend to be localized near the elbow, wrist, or knee, and occasionally in the ankle or groin areas, but do not involve the joint.

When small, the gross shape of the tumor is round or fusiform, and it is encapsulated. The tumor is solid when small, but as it grows larger, degeneration will occur with cystic changes. It is solitary early, but becomes multiloculated as it increases in size. These tumors will, in the majority of cases, be found attached to a readily recognized nerve, but occasionally the nerve is so small that it is overlooked by the surgeon. The histologic structure of a neurilemmoma is quite typical and may exhibit either a palisade type A with Verocay bodies or the reticular myxomatous type B with spindle cell components.[5] A common feature in both types is the tendency for the long slender cells and nuclei to be arranged in parallel fashion, which always suggests a nerve sheath origin.

Clinically, this tumor shows an equal sexual distribution. It may occur at any age, but is most common in the middle and late years of life. The usual reason for the patient to come to the physician is the presence of a neoplasm assuming large proportions. In the majority of cases there is no pain, paresthesia, hypoesthesia, or loss of motor power of the muscles supplied by the involved nerve. The lack of neurologic signs is attributed to the tumor forming a rounded or spindle-shaped mass through which the nerve fibers pass in widely separated groups, but with little, if any, damage to the axis cylinders. When neurologic signs are present in a tumor of the extremity, they offer a clue that

the neoplasm may have arisen from a peripheral nerve, but a lack of neurologic signs does not free the peripheral nerve from suspicion.

The malignant potential of a neurilemmoma is nil.[6] Although several cases of apparent malignant metamorphosis of a neurilemmoma have been reported in the older literature,[7,8] in none of these is the evidence of sufficient weight to permit a positive statement that this change has ever occurred. Stout[9] studied 144 of these tumors and none showed any evidence of malignancy or transformation to a malignant neoplasm.

The proper treatment of these tumors would therefore be surgical removal, but with avoidance of unnecessary injury to important nerve trunks, even at the risk of not removing all of the capsule. These tumors rarely recur, even if the capsule is not completely removed. The tumor can usually be "shelled out" following splitting of the nerve sheath, without sacrificing any of the nerve fibers.

Neurofibroma

Neurofibroma or neurofibromatosis is so closely associated with von Recklinghausen's disease that it is often forgotten that a neurofibroma commonly occurs as a solitary tumor, with none of the stigmata associated with von Recklinghausen's disease.

Neurofibroma can assume various forms, depending on its location in relation to the peripheral nerve. If the growth of Schwannian syncytium and fibrous elements occurs inside the perineurium, that portion of the nerve becomes thickened and fusiform or tortuous in shape. This is called a plexiform neurofibroma, and it occurs in the subcutaneous and deep fascial planes of the extremity. If the neoplasm occurs nearer the skin surface where the nerve bundles are near or at the end of their terminals, a tumor results which is not encapsulated but forms a circumscribed localized nodule. These are the characteristic neurofibromas of von Recklinghausen's disease. In the skin and subcutaneous tissues, there sometimes occurs an extension of the Schwannian and fibrous tissue from the nerve which may increase the bulk of the affected area to an enormous extent, producing a localized elephantiasis. Penfield[10] states that the term "neurofibroma" must be understood to signify a neoplasm which contains both neurogenic elements and connective tissue.

By palpation or at surgical exploration, the neurofibroma may be undistinguishable from a neurilemmoma. The presence or absence of von Recklinghausen's disease offers little help in the clinical differentiation between neurilemmoma and neurofibroma, as neurilemmoma is occasionally found in this entity. As has been previously stated, the malignant potential of a neurilemmoma is nil, but the serious nature of the neurofibroma is often overlooked.

Approximately one half of the cases of neurogenic sarcoma arise from neurofibromas associated with von Recklinghausen's disease, and the remainder arise from the solitary neurofibroma. Vieta and Pack,[11] reporting on 13 cases of neurogenic sarcoma, found 9 of their patients to have no stigmata of von Recklinghausen's disease, and they attribute the origin of the malignancy to be a solitary neurofibroma. Hosoi[12] reports that in 10 to 15 per cent of patients with neurofibromatosis, a neurofibroma undergoes malignant changes and that this is a frequent cause of death in von Recklinghausen's disease. The Memorial Hospital School group, headed by James Ewing, has come to believe that the majority, if not all, of the malignant spindle cell sarcomas of the deeper tissues of limb and trunk arise from the peripheral nerves. In the second edition of Ewing's "Neoplastic Diseases," published in 1922, there occurs the following statement: "It is probable that the great majority of fibromas and fibrosarcomas of the deeper tissues of limb and trunk are of neurogenic origin."[13] In the third edition (1928) there occurs the statement: "The great majority of spindle cell sarcomas of the extremities are of neurogenic origin and should be classed with neurofibroma, but it is probable that in comparatively rare cases tumors arise from other structures not connected with the nerve trunks or filaments."[14] Lichtenstein[15] mentions the possibility that fibrosarcomas of the skeletal system may conceivably represent malignant neurogenic tumors arising in the bone. Thus, it is apparent that the neurofibroma, whether or not it is associated with von Recklinghausen's disease, will frequently undergo malignant changes and become a neurogenic sarcoma.

Neurogenic sarcoma

Synonyms of this neoplasm include fibrosarcoma of peripheral nerve, malignant neurofibroma, malignant neurilemmoma, and malignant schwannoma. Terminology is somewhat confusing, in that the neural crest from which the neurogenic elements of this neoplasm are derived is ectodermal in origin and not wholly mesodermal, as the name would imply. Also, the use of the terms "malignant neurilemmoma" and "malignant schwannoma" adds to the confusion in terminology, as an authentic malignant transformation of a neurilemmoma (schwannoma) is nonexistent as far as can be concluded from reports in the literature. The impression exists that neurogenic sarcoma is a rarity, but this would seem to be simply because it goes unrecognized.

Neurogenic sarcoma may develop at any age, but it is more common in the later years of life. Sites of predilection for this neoplasm in the extremities are identical to those given for neurilemmoma. The patient will relate having had a noticeable tumor in the extremity for some time, usually a year or more. The presenting complaint will be an increase in growth of the mass, and rarely pain or neurologic symptoms. Often the patient will relate that a "simple" tumor was removed from the same site and that the tumor has now grown back.

Neurogenic sarcoma is a relatively slow-growing neoplasm which remains localized for some time, unless stimulated by incomplete surgery. At clinical examination and/or at surgical exploration, neurogenic sarcoma may mimic either neurilemmoma or neurofibroma. The neoplasm may remain confined within the nerve sheath, expanding it, and reach large proportions without showing any noticeable gross invasion of the adjacent soft tissues. However, the encapsulation can be shown histologically to contain viable neoplastic cells, and, in dissecting the tumor free, points of adherence to the surrounding tissues serve as foci for local recurrence if the neoplasms are not removed in toto. Another reason given for the frequent recurrence of these tumors following surgery is that extension is by way of the perineural, perivascular, and intraneural spaces with a resultant "seeding" of the involved nerve at some distance from the gross pathology.

The neurogenic sarcoma in its early stages will be a solitary fusiform or ovoid tumor, arising from a peripheral nerve and indistinguishable from a neurilemmoma or neurofibroma. As the neoplasm continues to develop, lobulation will occur with the formation of a "cluster of grapes" appearance. The individual lobules will vary in consistency from a firm, gray, homogenous

appearance to being degenerative, fluctuant, semigelatinous cysts. Interlacing strands of fibrous tissue will tend to bind the lobules together. The lobulated neurogenic sarcoma is quite similar on palpation and at surgical exploration. It was from this "cluster of grapes" appearance that I have twice diagnosed neurogenic sarcoma prior to microscopic confirmation.

Histologically neurogenic sarcoma will show strands of tightly packed, elongated cells. The nuclei are elongated, deeply staining, and rippled or waved. The appearance of large tumor giant cells in the section and the tendency for cells to line up in parallel rows are important diagnostic points, the one indicating a high degree of malignancy and the other recalling the growth characteristics of regenerating neurogenic elements.

The innocent appearance and accessibility to removal of the neurogenic sarcoma at an early stage provides an inviting setting for simple enucleation. In the vast majority, however, the surgery is incomplete with consequent local recurrences. Incomplete surgery tends to aggravate the tumor into a faster and more malignant growth. The patient frequently succumbs to progressive cachexia resulting from repeated operations and recurrences. The neoplasm infiltrates insidiously, but metastasizes freely through the blood stream and rarely through the lymphatics. Pain, necrosis, infection, local disabilities, and pulmonary metastasis are contributing factors to the cause of death. A survey of the literature reveals that the number of operative 5-year survivals for neurogenic sarcoma is far less than for carcinoma of the breast or prostate.

Radical local resection or amputation when necessary constitute the only means of combating this neoplasm. Neurogenic sarcoma is not sensitive to radiation therapy; each class of malignancy is individual in its treatment. The patient who has had no previous surgery for the neoplasm might well be a candidate for radical resection, providing the size and the site of the mass are amenable to this procedure. The neoplasm plus its bed and any attached nerve, muscle, or vessel must be excised en bloc. The nerve of origin, if demonstrable, must be sacrificed far above from the neoplasm. The presence of a pathologist and facilities for rapid frozen sections are as essential as the surgeon; a frozen section microscopic analysis during the surgery is necessary in determining the extent of the neoplasm and in planning the operative procedure. An amputation is deemed necessary for all recurrences and for those neurogenic sarcomas which are inaccessible because of size or site. Once osseous invasion has taken place, a primary amputation is necessary. However, if local osseous invasion has occurred, prognosis is poor even if primary amputation is performed.

Fig. 1

Fig. 2

Fig. 3

Case reports

Case 1. A 66-year-old female, with a tumor of the left elbow, was first seen in August 1953. The tumor was first noticed early in 1950. At that time it was asymptomatic; however, because of a gradual increase in size, surgical removal had been performed in May 1952. At that time the tumor was the size of a small orange. The postoperative period was uneventful until approximately 5 months following surgery, at which time the tumor began to recur. At no time had there been any pain or disability resulting from the tumor.

Physical examination was essentially noncontributory, except for the presence of a large multiloculated mass over the posterior aspect of the left elbow (Figs. 1 and 2). The tumor was approximately 13 cm. in its greatest diameter. The old operative site was well healed, but the integument over the mass was poorly nourished and displaced, and had a cyanotic hue. Seven distinct lobules could be palpated in the gross tumor, and they varied in their consistency from semifluctuant to firm. The integument was fixed to the underlying tumor at several points. The mass was not tender unless firm pressure was applied to it. No palpable antecubital or axillary lymphadenopathy was detected.

Laboratory examinations, including a metastatic series, was essentially negative. X-rays of the left elbow revealed the presence of the previously described soft tissue mass with a reactionary periostitis of the lateral supracondylar area (Fig. 3).

A high left humeral amputation was performed in September 1953. Postoperative dissection of the neoplasm in the amputated extremity revealed a "cluster of grapes" mass. No specific peripheral nerve could be identified as entering the neoplasm. A detailed description of the neoplasm will not be given, as no photographs were made of the dissection. However, it was grossly identical to subsequent cases of which photographs were made. The pathologic diagnosis was fibrosarcoma of nerve sheath origin.

In visits of this patient until March 1954, no recurrence of the neoplasm, either clinically or roentgenologically (metastatic series), had been detected. The patient failed to make subsequent clinic visits until September 1954, at which time she was readmitted to the hospital in a moribund condition due to advanced pulmonary metastases. She died in October 1954.

Fig. 4

Fig. 5

Case 2. A 78-year-old white female was first seen in December 1954, with a tumor above her left ankle. This tumor had first been noticed in February 1952, when it had been a single "bump." No pain or loss of function had been noted in the extremity. In August 1952, surgical excision of the tumor was promptly followed by a local recurrence. In June 1953, surgical excision was again followed by local recurrence. In January 1954, a third surgical attempt was followed by the recurrence of multiple tumors at the operative site, approximately 3 months postoperatively.

On physical examination the patient appeared well nourished and younger than her stated age. No stigmata of von Recklinghausen's disease were present. A multiloculated tumor, roughly ovoid in shape and measuring 12 cm. in its longitudinal axis, was present over the anterolateral aspect of the distal fibular area (Fig. 4). Approximately twelve discrete lobules, varying in diameter from 1 to 4 cm. and varying in consistency from fluctuant to firm could be palpated. There was no tenderness associated with palpation or pressure. Several of the individual lobules had ulcerated through integument and were discharging a clear, yellowish, viscous material. No popliteal or inguinal lymphadenopathy was palpable. No aberration of sensory perception was noted distally to the tumor, nor did the motor power of the foot or ankle differ from that of its mate.

Laboratory examination, including metastatic series, was noncontributory. X-rays of the affected extremity revealed the presence of a soft tissue tumor with pressure erosion of the lateral aspect of the distal fibular shaft (Fig. 5).

In December 1954, a disarticulation amputation was performed at the right knee. Photographs taken at the dissection of the neoplasm following the surgery revealed the "cluster of grapes" appearance (Figs. 6, 7, and 8). The superficial peroneal nerve was traced distally and was found entering the tumorous mass. In the deeper confines of the tumorous mass, several of the lobules showed capsulation, with extension into the adjacent soft tissues. Exploration of lymph nodes in the popliteal area showed no enlargement or pathologic condition. The pathologic diagnosis was neurofibrosarcoma with myxomatous changes.

The postoperative phase was uneventful, and approximately 3 months following surgery, the patient was fitted with a prosthesis. At this early date, approximately 15 months postoperatively, there is no evidence of metastatic phenomena.

Case 3. A 79-year-old white male first noticed a tumor in his right thigh approximately in January 1955. Over the next few months the mass increased in size. At no time were there any pains or symptoms other than the presence of the mass.

Physical examination disclosed no criteria of von Recklinghausen's disease. Over the inner aspect of the right mid-thigh, a firm fusiform mass approximately 17 cm. in its longitudinal axis was present. The mass was not fixed to the skin, palpation revealing a firm ovoid lobule approximately 9 cm. in diameter, near the center of the tumorous mass. Several smaller lobules with diameters of 2 to 4 cm. were palpated at the proximal and distal aspects of the tumorous mass. Palpation of the small lobules was difficult because of their deeper location. The mass was not tender. The inguinal lymph glands presented no palpable lymphadenopathy. There were no perversions of the sensory apparatus distally to the mass. Laboratory examination was noncontributory and roentgenograms revealed no osseous involvement.

In March 1956, a block removal of the tumorous mass and adjoining tissue was performed. Photographs of the tumor, taken during surgery and following its removal, reveal the presence of one large globule and approximately eight smaller ones (Figs. 9 and 10).

A tributary from the medial cutaneous nerve of the thigh (anterior branch) was traced into the tumorous mass, and the patient noted postoperatively an area of anesthesia corresponding to its distribution. The diagnosis was neurogenic sarcoma.

Discussion

These three cases of neurogenic sarcoma present certain similarities and are consistent with the usual findings of other reported cases: (1) advanced age of the patient; (2) history of previous surgery for a tumor of an extremity, with prompt recurrence; (3) relative absence of pain, even with the tumor assuming large size; (4) the rarity of associated symptoms or

Fig. 6

Fig. 7

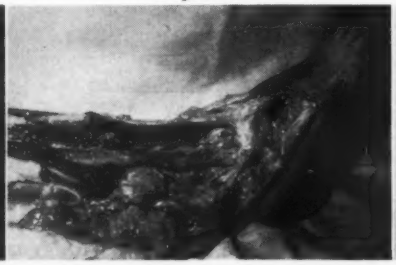

Fig. 8

Fig. 9

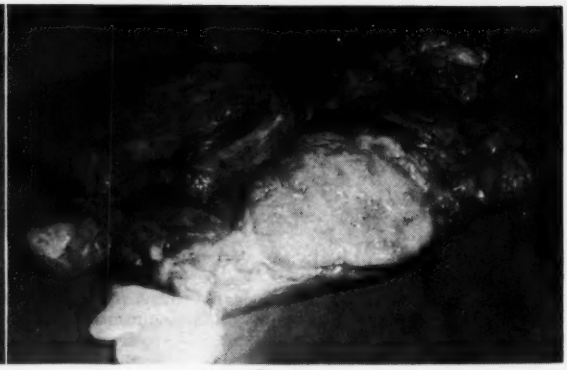

Fig. 10

signs; (5) palpation of a multiloculated tumor; (6) "cluster of grapes" appearance of the advanced tumor; (7) the occasional inability to identify a distinct nerve entering the neoplasm, especially when advanced; and (8) hazardous prognosis.

Summary

A brief review of two benign neurogenic tumors, neurilemmoma and neurofibroma, including their similarities and relationships to neurogenic sarcoma, is presented. Neurogenic sarcoma is also discussed.

Three illustrated cases of neurogenic sarcoma are presented, with special emphasis on similar clinical and pathologic findings in all three.

766 S. Kingsley Dr.

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Book notices

(Continued from page 568)

▶ THE ACCIDENT SYNDROME. The Genesis of Accidental Injury. A Clinical Approach. By Morris S. Schulzinger, M.A., M.D. Cloth. Pp. 234, with illustrations. Price $6.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1956.

As diseases have symptoms, so do accidents, according to the author of this book. Delineation of "The accident syndrome" developed as a result of a study of some 35,000 consecutive accidents over a period of 18 years. The elements of the syndrome are: (1) universal risk; (2) abnormal physical environment, such as inclement weather; (3) a maladjusted and irresponsible personality; and (4) a trigger mechanism, such as loss of balance or a rash decision. The author concludes from his research that most accidents happen to maladjusted young men with unbridled aggressiveness. He also states that on the basis of his formulation of the syndrome, it is now possible to predict with certainty when, to whom, and under what conditions accidents are most likely to occur. One of the most interesting points in the book is the author's scant recognition of inherent accident proneness, a subject usually given more respect. He says that persons may be temporarily accident prone because of emotional stress, but that there are only a few individuals highly accident prone throughout life. The book contains a full chapter, Chapter IV, of charts and tables formulated from the author's long and wide study of accidents. They present statistics on the rate of incidence of industrial and non-industrial accidents, annually, seasonally, and by age and sex.

▶ LANDMARKS IN THE HISTORY OF HYGIENE. University of London, Heath Clark Lectures 1952 delivered at The London School of Hygiene and Tropical Medicine. By Henry E. Sigerist, M.D., D.LITT., LL.D., D.S.C., F.R.C.P., Research Associate in the History of Medicine, Yale University. Cloth. Pp. 78, with illustrations. Price $3.00. The Oxford University Press, 114 Fifth Ave., New York 11, 1956.

In 1952 Dr. Henry E. Sigerist left his scholarly retreat in Switzerland to deliver the Heath Clark Lectures at the London School of Hygiene and Tropical Medicine. The discriminating reader may now read the lectures in a slim but fascinating volume made available by the Oxford University Press. The untimely death of Dr. Sigerist, noted editorially in THE JOURNAL last month, lends special interest to the book, since this could be one of the last of his printed works.

The lectures are primarily a delightful introduction to individual and community health problems and their handling at various historical periods. In the typical Sigerist manner, the author does not permit the reader to rest there but leads him directly to currently related problems and their meaning for the human situation today.

The body of the volume deals successively with Galen's *Hygiene*, the *Regimen sanitas* of Salerno, the Renaissance quest for longevity, John Peter Frank (1745-1821) as a pioneer of social medicine, and the patterns of medical care as they appear at the mid-century. Thoughtful reading of the final lecture dealing with these tremendously changed medical care patterns in every nation will prove an illuminating experience to physicians, medical educators, and individuals generally who are concerned with social welfare. Sigerist's succinct historical analyses makes possible a broad appreciation of present health problems not found elsewhere by this reviewer.

One paragraph of the final lecture is especially pertinent. "Medicine," says Dr. Sigerist, "is less and less the healing art. . . ." He points to medicine as becoming increasingly a social science with four main tasks: promotion of health by all known methods; prevention of illness through traditional public health measures; restoration of health where prevention has failed (still too largely considered its only task); and rehabilitation, which may require special schooling. This kind of cure calls for a health system. How can it be financed? That, the author concedes, must be decided by each nation for itself.

Although this attractively designed and printed book of seventy-eight pages is actually a scholarly production, it is most interesting, affording to the reader an enriching experience, hitching the present onto the past to make the present understandable and challenging.

▶ **PRACTITIONERS' CONFERENCES Held at The New York Hospital-Cornell Medical Center. Volume 4. Edited by Claude E. Forkner, M.D., F.A.C.P., Professor of Clinical Medicine, Cornell University Medical College; Attending Physician, The New York Hospital; Consultant in Medicine (Hematology), Roosevelt Hospital. Cloth. Pp. 407, with illustrations. Price $6.75. Appleton-Century Crofts, 35 W. 32nd St., New York 1, 1956.**

In an attempt to help New York practicing physicians keep up with recent advances in caring for everyday clinical problems, Dr. Claude F. Forkner developed a program called Practitioners' Conferences. This fourth volume again contains edited and summarized panel discussions arising from these series of conferences. The current volume deals with such topics as pulmonary hypertension, hypothyroidism and hyperthyroidism, fractures of the hip, anemia, burns, obesity, ileitis, homosexuality, and the role of religion in healing. As in previous works, the names of the panelists, each an authority on the subject, appear at the beginning of each chapter. The discussions are written up in their original dialogue form and make for interesting reading. Each chapter concludes with a summary by the editor and a list of references.

▶ **CLINICAL HEMATOLOGY. By Maxwell M. Wintrobe, M.D., Ph.D., Professor and Head, Department of Medicine and Director, Laboratory for the Study of Hereditary and Metabolic Disorders, University of Utah, College of Medicine, Salt Lake City, Utah; Formerly Associate in Medicine, Johns Hopkins University, Associate Physician, Johns Hopkins Hospital, and Physician-in-Charge, Clinic for Nutritional, Gastro-Intestinal and Hemopoietic Disorders, Baltimore, Maryland. Ed. 4. Cloth. Pp. 1184, with illustrations. Price $15.00. Lea & Febiger, Washington Square, Philadelphia 6, 1956.**

To prepare this fourth edition of this encyclopedic work in hematology, Dr. Winthrobe has had to digest, ponder in relation to each other and to past knowledge, and organize the rapidly accumulating additions to his special field. As a result of this, he has radically revised the work, both from the standpoint of additions and from that of rewriting and condensing. New chapters on blood groups and transfusions and on abnormal hemoglobin syndromes have been added, and major rewriting has been done in the sections dealing with production and destruction of red blood cells, coagulation, hemolytic anemias, and hemorrhagic disorders. Statistics have been graphically compiled into twenty-three new tables, and there are numerous new illustrations as well as several new color plates.

The present edition continues the scholarly excellence of former editions and contains a wealth of new material and critical revision of older material. Thoroughly indexed, the book includes excellent reference lists and guides to further references. The make-up is clear, easy to read, and consistent; the plates and illustrations well reproduced. Assuredly it is a valuable book for all practitioners and students.

▶ **J.A.M.A. QUERIES AND MINOR NOTES, 1956. Published for the American Medical Association. Cloth. Pp. 334. Price $5.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1956.**

Selected notes and queries which appeared in *The Journal of the American Medical Association* from June 1954 through June 1955 are collocated in this volume, classified and listed according to the "Standard Nomenclature of Diseases and Operations," and offered to the physician. Although the book is a handy reference and most certainly interesting browsing, the same information—plus the items not included in this compilation—appeared in and were indexed in *The Journal*. Subjects treated and coverage given are more or less random, so that to rate it as a valuable or essential volume is impossible.

▶ **DISEASES OF THE HEART. By Charles K. Friedberg, M.D., Attending Physician, The Mount Sinai Hospital, New York; Associate Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University. Ed. 2. Cloth. Pp. 1161, with illustrations. Price $18.00. W. B. Saunders Company, W. Washington Square, Philadelphia 5, 1956.**

The first edition of this work appeared in 1949 and was hailed for its intrinsic merit and soundness. The second edition sustains the high quality both in content and presentation.

The newer edition is considerably longer, owing in part to the addition of three chapters dealing with graphic methods of examination as well as discussions of the clinical application of these methods in the various heart diseases. A large section has been devoted to heart surgery, and the use of drugs in the treatment of all heart disorders is thoroughly explored. The book remains one of the best single-volume sources dealing with diseases of the heart.

Restricted by the amount of material to be covered in one volume, the author has not been able to use many illustrations. The x-rays, graphs, and charts which appear are minimal complements to the text. The index is extensive and accurate, and each section contains an exhaustive bibliography.

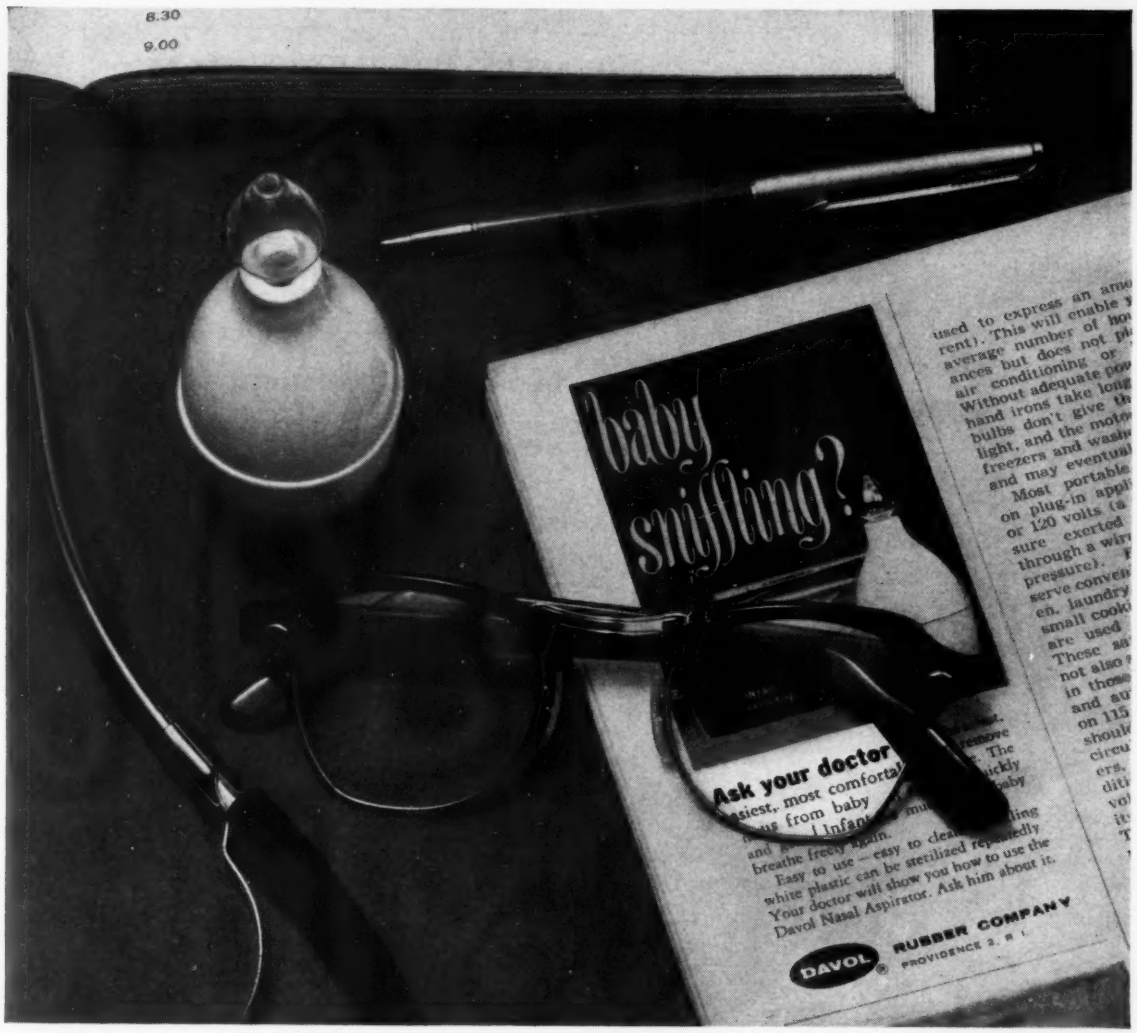
▶ **PEDIATRICS. Edited by Donald Paterson, M.D., Formerly Clinical Professor, Department of Pediatrics, The University of Britsih Columbia; and John Ferguson McCreary, M.D., Professor and Head, Department of Pediatrics, The University of British Columbia; with 36 Contributing Authors. Cloth. Pp. 654, with illustrations. Price $14.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1956.**

Believing that doctors need a clearly written, concise reference book that would serve between the consultant texts and small books of tabular style, the editors planned this pediatric text with heavy stress in differential diagnosis and treatment of common childhood complaints.

They offer guides to the differential diagnosis of the causes of vomiting and explanations of the principles that guide differential treatment in cases of diarrhea. The presentation of the anemias is well organized and further clarified by the presentation of characteristic and treatment charts designed for clinical use. The problem of electrolyte and fluid balance is approached in two ways: practical therapy to give immediate assistance to the patient suffering from dehydration due to diarrhea and laboratory approaches for further study and the application of basic principles to therapy.

Aware of the modern trend of parents to turn to the physician for advice regarding the emotional development of their children, physicians are encouraged to fulfill the role of counselor and are advised on how to talk with parents. In the same way, physicians are told how they can assist in public health programs, especially in small communities.

Extensive reference lists are supplied and the index is excellent. The text is supplemented by charts on drug therapy for children, values in laboratory tests, and on diets. Illustrations—photographs, x-rays, and drawings—are excellent.



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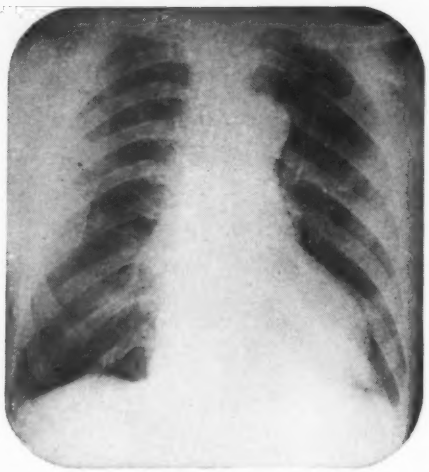

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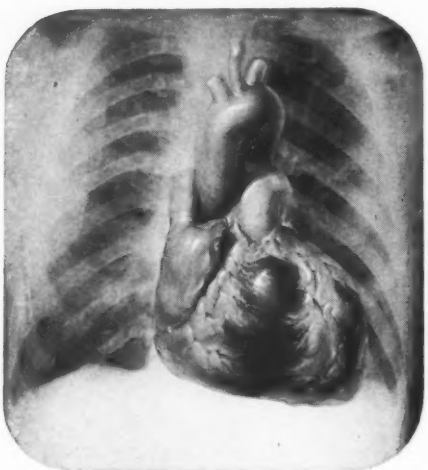

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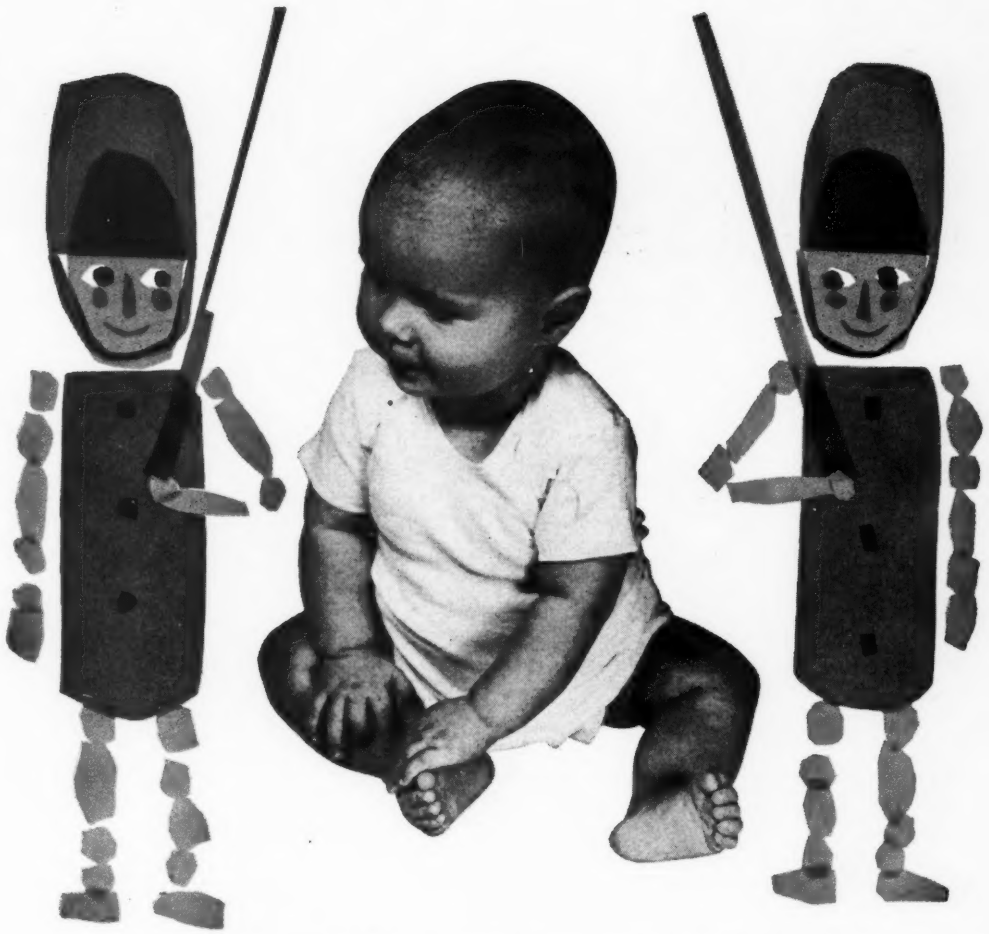

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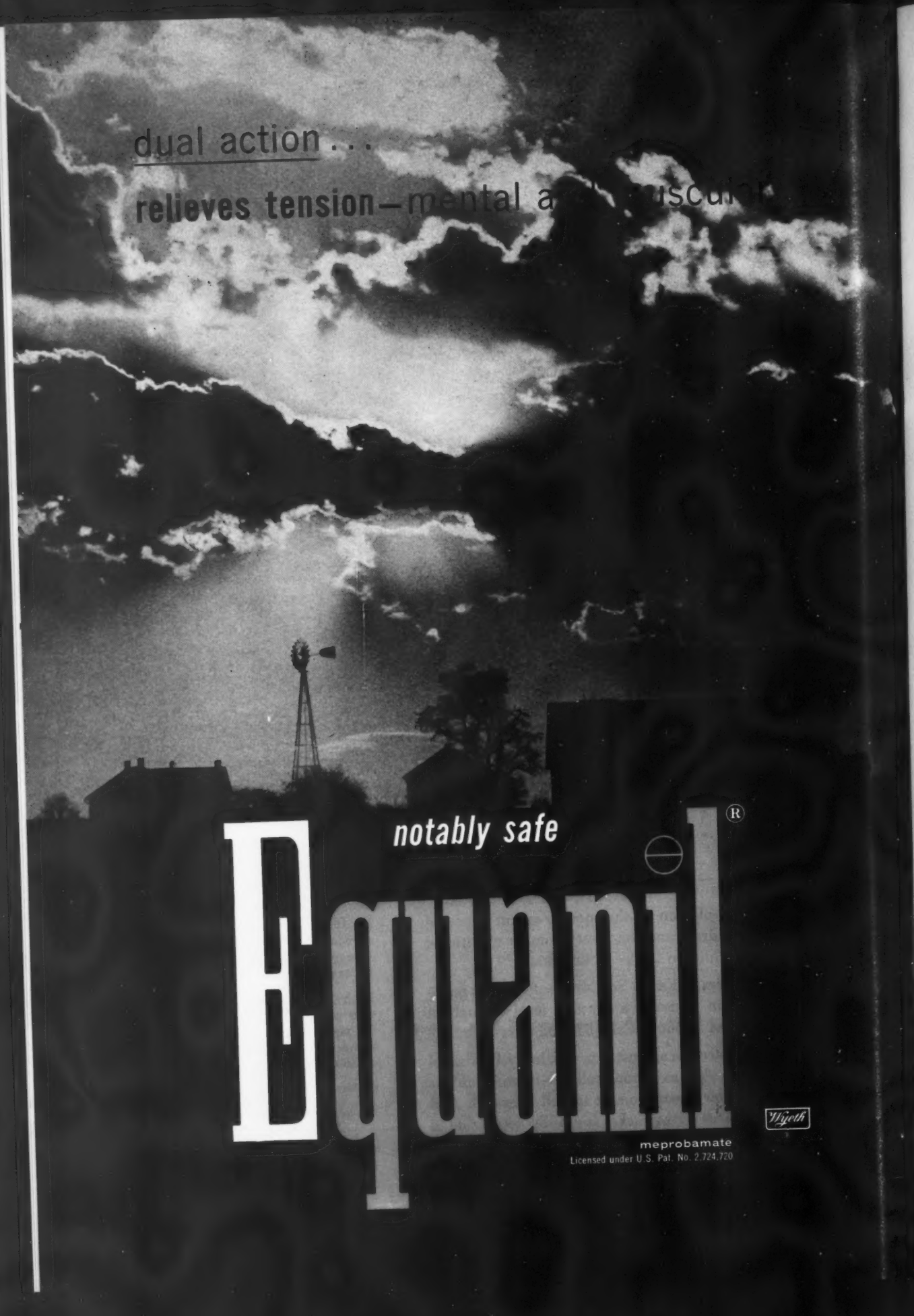
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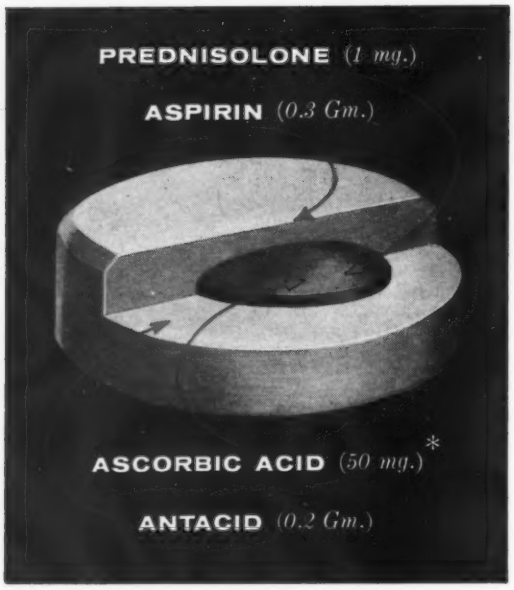

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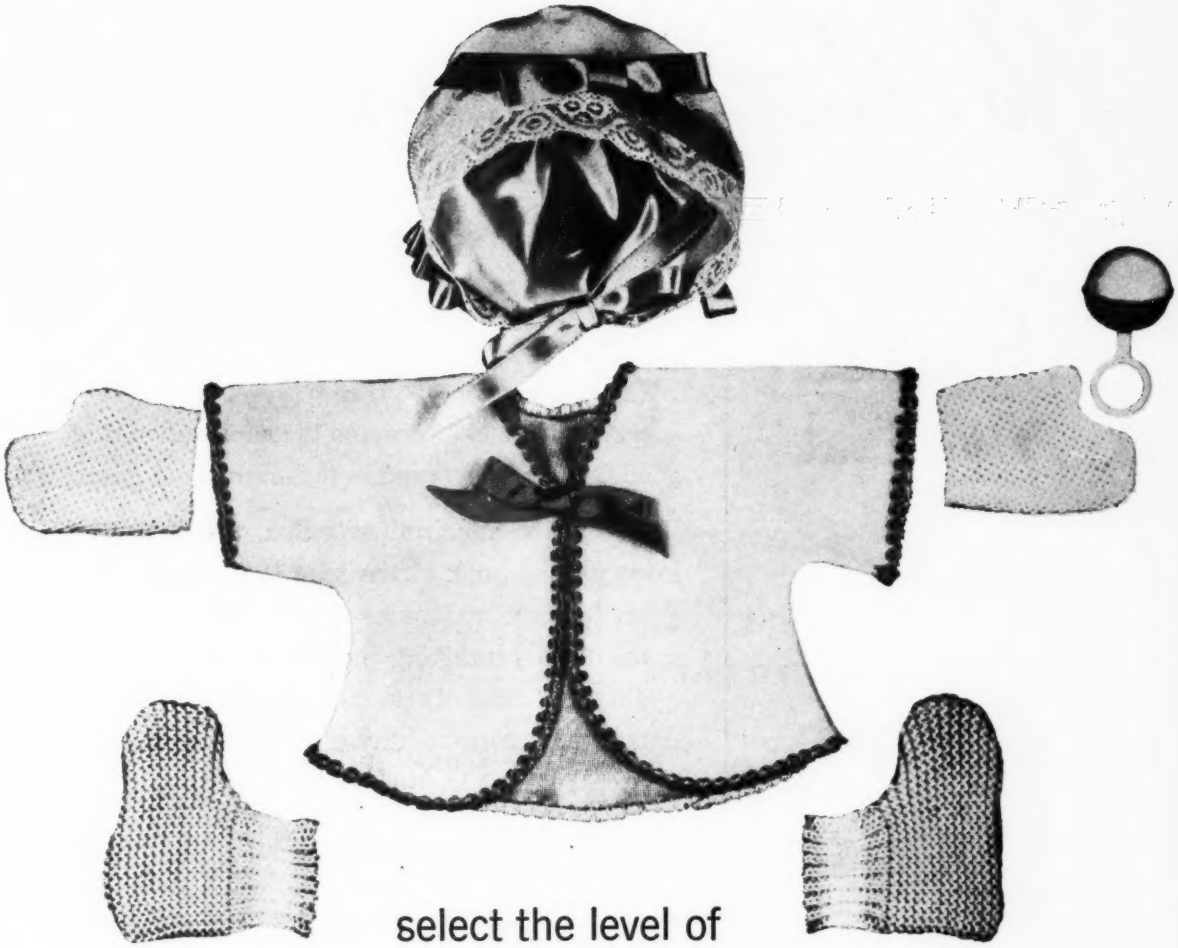

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1. Facts on Oats: Report by the Research Laboratories of The Quaker Oats Company, 1955.

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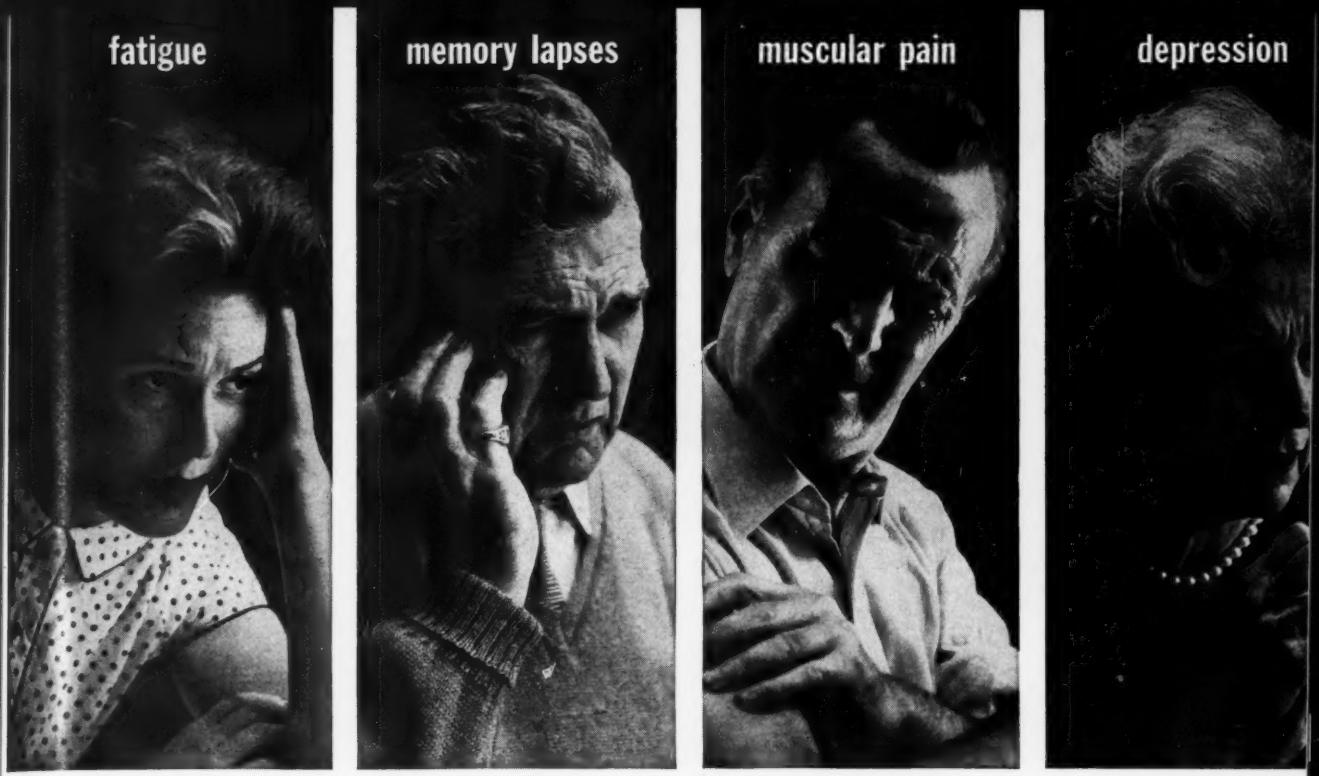

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References: 1. McGavack, T. H.: Geriatrics *5*:151 (May-June) 1950. **2.** Masters, W. H.: Obst. & Gynec. *8*:61 (July) 1956. **3.** Kimble, S. T., and Stieglitz, E. J.: Geriatrics *7*:20 (Jan.-Feb.) 1952. **4.** Kountz, W. B., and Chieffi, M.: Geriatrics *2*:344 (Nov.-Dec.) 1947. **5.** Birnberg, C. H., and Kurzrok, R.: J. Am. Geriatrics Soc. *3*:656 (Sept.) 1955.

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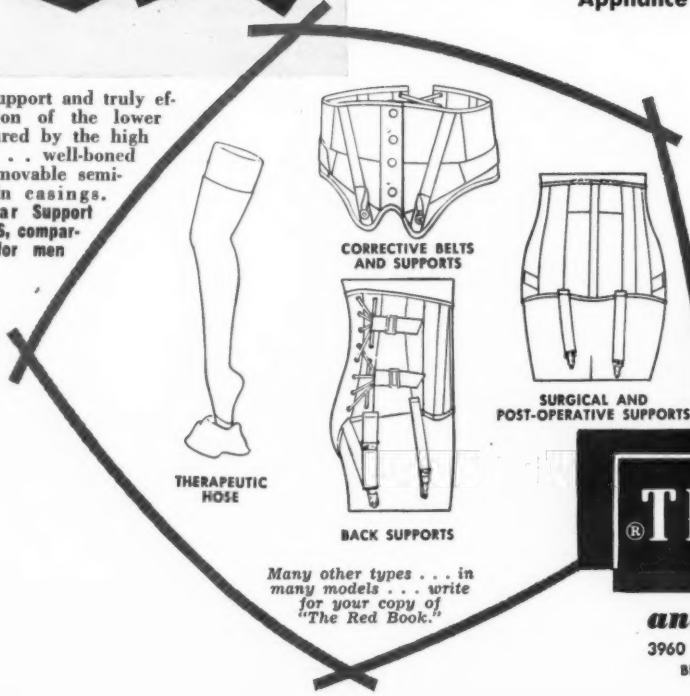

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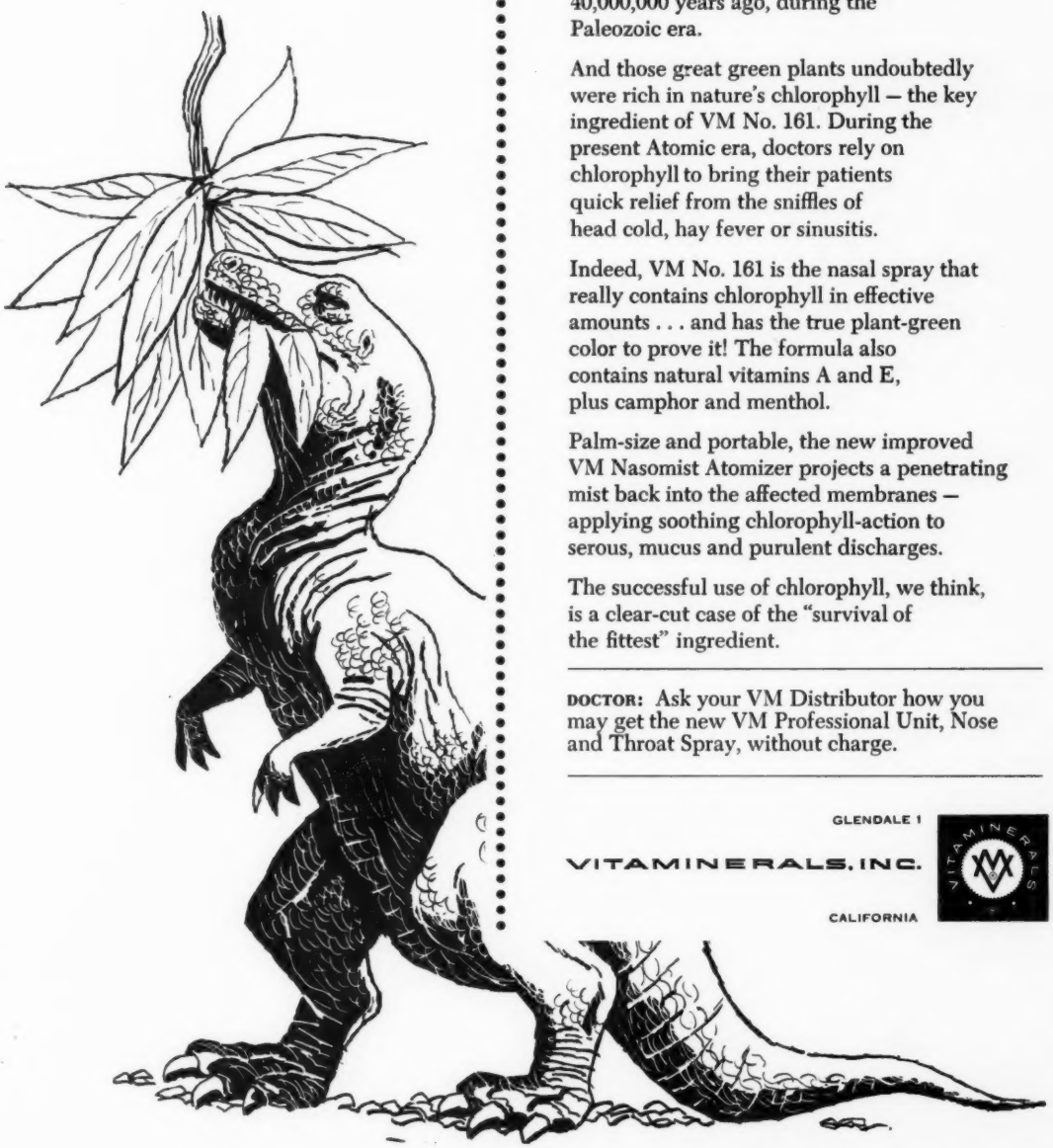

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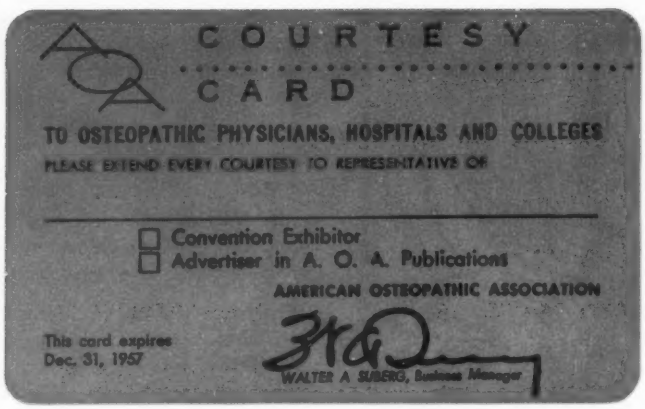

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1. Bacala, J.C.: The Use of the Systemic Hemostat, Carbazochrome Salicylate, West. J. Surg. *64*:88 (Jan., 1956)

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Orzac, E.: Medical Care of the Child Patient Before and After Adenoidectomy and Tonsillectomy, N.Y. State J. Med. *55*:886 (Mar., 1956)

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Riddle, A.C., Jr.: Adrenosem Salicylate: A Systemic Hemostat, Oral Surg., Oral Med., Oral Path. *6*:617 (June, 1955)

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References:

1. McCarthy, John T., and Nelson, Carl T.: Pediatric Clinics of North America, Philadelphia, W. B. Saunders & Co., August 1956, p. 514.
2. Samuels, Saul S.: Angiology 7:532 (Dec.) 1956.
3. Panaccio, Victor: Canad. M. A. J. 75:592 (Oct.) 1956.

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1. Cornely, D. A., and Ritter, J. A.: N-acetyl-p-aminophenol (Tylenol Elixir) as a Pediatric Antipyretic-Analgesic, J.A.M.A. *160*:1219 (Apr. 7) 1956.

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Conventions and meetings

Announcements

American Osteopathic Association, Sixty-First Annual Convention, Hotels Adolphus, Baker, and Statler, Dallas, Tex., July 15-19. Program Chairman, Neil R. Kitchen, 18820 Woodward Ave., Detroit.

Academy of Applied Osteopathy, annual meeting, Hotel Baker, Dallas, Tex., July 19-20. Program Chairman, Margaret H. Raffa, 5009 Central Ave., Tampa 3, Fla. Secretary, Margaret W. Barnes, P. O. Box 1345, Carmel, Calif.

American College of General Practitioners in Osteopathic Medicine and Surgery, midyear clinical conference, November 8-10, Sheraton-Cadillac Hotel, Detroit. Program Chairman, W. Clemens Andreen, 1475 Ford Ave., Wyandotte, Mich. Secretary, Alfred J. Schramm, 5880 San Vicente Blvd., Los Angeles.

American College of Neuropsychiatrists, annual meeting, July 12-13, Hotel Baker, Dallas, Tex. Secretary, Don C. Littlefield, 4320 Atlantic Ave., Long Beach 7, Calif.

American College of Osteopathic Internists, annual meeting, Hotel del Coronado, Coronado, Calif., September 26-28. Program Chairman, Delmar Daniel, 400 N. Glenoaks Blvd., Burbank, Calif. Secretary, Glennard E. Lahrson, 460 Staten Ave., Oakland 10, Calif.

American College of Osteopathic Pediatricians, annual meeting, Hotel Statler, Dallas, Tex., July 12-14. Secretary, Harold H. Finkel, 248 W. Main St., Ephrata, Pa.

American College of Osteopathic Surgeons, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 27-31. Program Chairman, Don E. Ranney, 793 N. Renaud, Grosse Pointe Woods 36, Mich. Executive Assistant, Mrs. E. F. Martin, Box 474, Coral Gables 34, Fla.

American Osteopathic Academy of Orthopedics, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 27-31. Secretary, J. Paul Leonard, 2673 W. Grand Blvd., Detroit 8.

American Osteopathic College of Anesthesiologists, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 27-31. Program Chairman, Lawrence Everett Giffen, 209 Monroe St., Jefferson City, Mo. Secretary, Crawford M. Esterline, Box 155, Kirksville, Mo.

American Osteopathic College of Pathologists, annual meeting, Hotel Baker, Dallas, Tex., July 15-16. Secretary, Arthur L. Wickens, Mt. Clemens General Hospital, Macomb at North, Mt. Clemens, Mich.

American Osteopathic College of Radiology, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 27-31. Secretary, F. A. Turfler, Jr., South Bend Osteopathic Hospital, 118 S. William St., South Bend 2, Ind.

American Osteopathic Hospital Association, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 26-30. Program Chairman, Mr. Heber Grant, 466 E. Olive Ave., Burbank, Calif. Executive Secretary, Mr. R. P. Chapman, 604 Kahl Bldg., 326 W. Third St., Davenport, Iowa.

California, annual meeting, Hotel del Coronado, Coronado, May 15-19. Executive Secretary, Mr. Thomas C. Schumacher, 1298 Wilshire Blvd., Los Angeles 17.

Colorado, Rocky Mountain Osteopathic Conference, Broadmoor Hotel, Colorado Springs, November 15-17. Secretary, C. Robert Starks, 1459 Ogden St., Denver.

Florida, annual meeting, Jacksonville

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[1]Fuller, H. L. and Kassel, L. E.: Antibiotic Medicine and Clinical Therapy, 3:322, October 1956.

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September 30-October 2. Program Chairman, Louis J. Larmoyeux, 124 E. Ashley St., Jacksonville 2. Secretary, Dominic Raffa, 5009 Central Ave., Tampa 3.

Idaho, annual convention, Owyhee Hotel, Boise, May 17-19. Program Chairman, L. D. Anderson, 308 Eastman Building, Boise. Secretary, Emery J. Miller, 124-128 Caldwell Blvd., Nampa.

Indiana, annual meeting, Marott Hotel, Indianapolis, May 19-21. Program Co-chairmen, Paul van B. Allen, 1500 N. Delaware St., Indianapolis 2, and H. E. Rinne, 519-20 Merchants Bank Bldg., Indianapolis 4. Secretary, Arabelle B. Wolf, 4840 N. Michigan Rd., Indianapolis 8.

Iowa, annual meeting, Savery Hotel, Des Moines, May 27-28. Program Chairman, R. S. Farran, Badgerow Bldg., Sioux City 9. Secretary, Mr. Herman W. Walter, 200 Walnut Bldg., Des Moines 9.

Kentucky, annual meeting, Brown Hotel, Louisville, October 16-17. Program Chairman, Paul E. Dunbar, 2505 Cherokee Highlands, Paducah. Secretary, Martha Garnett, 2829 Brownsboro Road, Louisville 6.

Louisiana, annual meeting, Buena Vista Hotel, Biloxi, Miss., October 24-26. Program Chairman, Melbert R. Higgins, Box 286, S.L.I., Lafayette. Secretary, V. L. Wharton, 406-407 Weber Bldg., Lake Charles.

Maine, annual meeting, Samoset Hotel, Rockland, June 27-29. Professional Education Chairman, Donald P. Miller, Main St., Norridgewock. Secretary, Roswell P. Bates, 72 Main St., Orono.

Massachusetts, annual meeting, Somerset Hotel, Boston, January 18-19, 1958. Secretary, Robert R. Brown, 64 Trapelo Rd., Belmont 78.

Michigan, annual meeting, Pantlind Hotel, Grand Rapids, September 30-October 2. Program Chairman, John E. Leech, 1149 Iroquois Dr., S.E., Grand Rapids 6. Secretary, P. Ralph Morehouse, 214 S. Superior St., Albion.

Missouri, annual meeting, Muehlebach Hotel, Kansas City, September 11-13. Program Chairman, Howard E. Gross, 1102 E. Normal Ave., Kirksville. Secretary, Mr. Paul D. Adams, 325 E. McCarty St., Jefferson City.

New York, annual meeting, Hotel Statler, New York City, October 11-12. Program Chairman, William O. Kingsbury, 60 E. 42nd St., New York 17. Secretary, C. Fred Peckham, 27 W. Bridge St., Oswego.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 24-26. Program Chairman, S. Dales Foster, 710 Public Service Bldg., Asheville.

Northwest Osteopathic Convention, Multnomah Hotel, Portland, Oregon, June 17-20. Program Chairman, Russell F. Kenaga, 2265 W. Burnside St., Portland 5, Oregon. Secretary, Washington, Mrs. Dorcas L. Sizer, 1747 S. Sheridan Ave., Tacoma 5. Secretary, Oregon, David E. Reid, Box 372, Lebanon.

Oklahoma, annual meeting, Hotel Tulsa, Tulsa, November 5-7. Program Chairman, Ray H. Thompson, 409 W. Canadian St., Vinita. Secretary, G. R. Thomas, 2929 N. Walker, Oklahoma City 18.

Oregon: See Northwestern Osteopathic Convention.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Statler-Hilton Hotel, Dallas, Texas, September 23-25. Executive Secretary, Clifford E. Foster, 1388 Gladys Ave., Lakewood 7, Ohio.

Pennsylvania, annual meeting, Chalfonte-Haddon Hall Hotels, Atlantic City, New Jersey, September 12-14. Program Chairman, Robert Friedman, 1201 Walnut St., Allentown. Executive Secretary, Mr. George W. Thomas, 1941 Market St., Harrisburg.

Rocky Mountain: See Colorado.

South Dakota, annual meeting, Huron, June 2-3. Program Chairman, F. A. Nutter, Jr., Box 368, Beresford. Sec-

retary, Earl W. Hewlett, 417 W. 27th St., Sioux Falls.

Vermont, annual meeting, Woodstock Inn, Woodstock, September 24-26. Program Chairman, Thomas P. Dunleavy, 162 N. Main St., Barre. Secretary, Howard I. Slocum, Battell Block, Middlebury.

Virginia, annual meeting, Williamsburg Lodge, Williamsburg, May 24. Program Chairman, Felix D. Swope, 609 Farragut Medical Bldg., Washington 6, D.C. Refresher course, Charlottesville, October 12-13. Secretary, John A. Cifala, 2778 N. Washington Blvd., Arlington.

Washington: See Northwest Osteopathic Convention.

West Virginia, annual meeting, Daniel Boone Hotel, Charleston, June 2-4. Program Chairman, Frank E. Pick, 4410 McCorkle Ave., S.W., South Charleston 3. Secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg.

Western States Osteopathic Society of Proctology, annual meeting, Riviera Hotel, Las Vegas, Nevada, October 7-9. Program Chairman, Marcus S. Gerlach, 2015 State St., Santa Barbara, California. Secretary, Earle F. Waters, 925 E. South Temple St., Salt Lake City 2, Utah.

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RECOGNIZABLE* eczema • asthma • persistent rhinitis • hyperirritability • colic • diarrhea • vomiting (pylorospasm) • cough • nasal stuffiness all these symptoms have been traced to cow's milk allergy TREATABLE with Borden's MULL-SOY®

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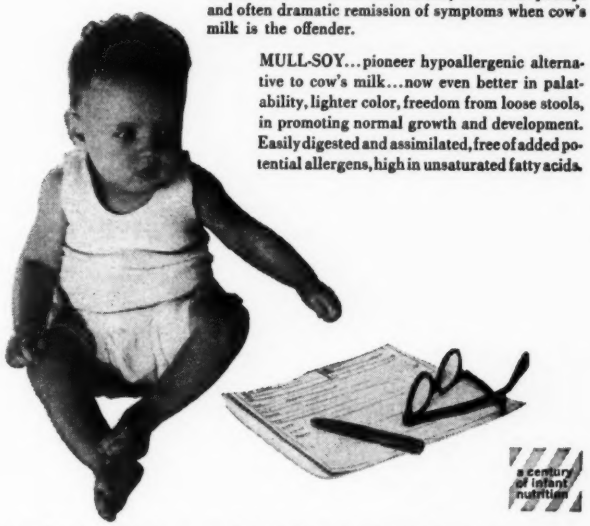

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State and national boards

ALABAMA

Examinations June 25-27. Address D. G. Gill, M.D., secretary, Board of Medical Examiners, State Office Bldg., Montgomery 4.

ARIZONA

Professional examinations June 13-15. Applications must be filed not less than 1 month prior to examination. Address Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 East McDowell Road, Phoenix.

Basic science examinations June 18 at the University of Arizona, Tucson. Applications must be filed 2 weeks prior to examinations. Address H. D. Rhodes, Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

COLORADO

Examinations June 11-12 at Denver. Applications must be filed by May 13. Address Mrs. Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 715 Republic Bldg., Denver 2.

CONNECTICUT

Examinations July 9-10. Applications must be filed by June 25. Address Frank Politsch, D.O., secretary, Osteopathic Examining Board, 300 Main St., New Britain.

DELAWARE

Examinations July 9-11. Address Joseph S. McDaniel, M.D., secretary, Board of Medical Examiners, 229 S. State St., Dover.

FLORIDA

Professional examinations June 29-30 at Mayflower Hotel, Jacksonville. Applications must be filed by June 1. Address W. S. Horn, D.O., secretary, Board of Osteopathic Medical Examiners, P.O. Box 85, Palmetto.

Basic science examinations June 8 in Miami. Applications must be filed by May 14. Address M. W. Emmel, D.V.M., secretary, Board of Examiners in the Basic Sciences, P.O. Box 340, Gainesville.

C. Markel Becker, Winter Haven, has been elected chairman of the Board of Osteopathic Medical Examiners upon the resignation of Louis J. Larmoyeux, Jacksonville. Thomas F. Sheffer, Fort Lauderdale, has been appointed for a 3-year term to fill the vacancy on the board.

GEORGIA

Examinations July 2 at Atlanta. Address Hoyt B. Trimble, D.O., secretary,

AGE . . . In older people, chronic constipation and biliary dyspepsia are often the result of decreased food and water intake, inactivity, intestinal muscle atonicity, increased anorectal disorders, biliary stasis.

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HAWAII

Examination dates by Territorial Law are usually the first Wednesday, Thursday, and Friday of January, April, July, and October. One of these dates is set for examination after approval of the candidate's application by the Board. Address Frank O. Gladding, D.O., secretary, Board of Osteopathic Examiners, 504 Kauikeolani Bldg., Honolulu 13.

IDAHO

Examinations June 13 at Boise. Address Margaret Gilbert, Director, Occupational License Bureau, Department of Law Enforcement, State House, Boise.

ILLINOIS

Examinations June 17-20 in Chicago. Address Mr. Frederic B. Selcke, Superintendent of Registration, Department of Registration and Education, State House, Springfield.

IOWA

Basic science examinations July 9 at the State House, Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

KANSAS

Examinations June 27-29 at the Hotel Jayhawk, Topeka. Applications must be filed by June 17. Address C. A. Welker, D.O., secretary, Board of Osteopathic Examination and Registration, J. C. Penney Bldg., Concordia.

MAINE

Examinations June 11-12. Address George Frederick Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

MARYLAND

Examinations in June. Address Christopher L. Ginn, D.O., secretary, Board of Osteopathic Examiners, 419 Charles St., Baltimore 1.

MASSACHUSETTS

Examinations July 9. Address Robert C. Cochrane, M.D., secretary, Board of Registration in Medicine, Room 37, State House, Boston.

MICHIGAN

Roy G. Bubeck, Jr., Grand Rapids, has been elected president of the Board of Osteopathic Registration and Examination. Others named to 1-year terms are Emmett Binkert, Carson City, vice president; C. J. Manby, Battle Creek, secretary-treasurer.

MINNESOTA

Basic science examinations June 4-5. Address Raymond N. Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

MISSISSIPPI

Examinations June 24-25 at the Robert E. Lee Hotel, Jackson. Applications must be filed prior to June 14. Address R. N. Whitfield, M.D., assistant secretary, Board of Health, Jackson.

NEVADA

Professional examinations June 29 at 210 W. Second St., Reno. Applications must be filed by June 15. Address Walter J. Walker, D.O., secretary, Board of Osteopathic Examiners, 210 W. Second St., Reno.

Basic science examinations July 2. Address Donald G. Cooney, Ph.D., secretary, Board of Examiners in the Basic Sciences, Box 9005, University Station, Reno.

NEW JERSEY

Examinations on June 18. Address Patrick H. Corrigan, M.D., acting secretary, Board of Medical Examiners, 28 W. State St., Trenton.

NEW MEXICO

Basic science examinations July 21. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P.O. Box 1522, Santa Fe.

NEW YORK

Examinations July 9-12 at Albany, Buffalo, New York City, Rochester, and Syracuse. Applications must be filed by June 10. Address John W. Paige, M.D., Chief, Bureau of Professional Examina-

tions and Registrations, State Education Department, 23 S. Pearl St., Albany 7.

NORTH CAROLINA

Examinations July 1 at Raleigh. Applications must be filed by June 20. Address F. R. Heine, D.O., secretary, Board of Osteopathic Examination and Registration, 108 Kensington Rd., Greensboro.

NORTH DAKOTA

Examinations July 14 in Minot. Applications should be filed no later than June 15. Address G. L. Hamilton, D.O., secretary, Board of Osteopathic Examiners, 119 Main St., South, Minot.

OHIO

Examinations June 13-15 in Columbus. Applications should be filed no later than June 5. Address H. M. Platter, M.D., secretary, Medical Board, 21 West Board St., Columbus 15.

OREGON

Examinations during July in Portland. Address Mr. Howard I. Bobbitt, executive secretary, Board of Medical Examiners, 609 Failing Bldg., Portland.

David E. Reid, D.O., Lebanon, has been re-elected to the Board for a 5-year term.

RHODE ISLAND

Professional examinations June 27-28 at Providence. Applications must be filed by May 27. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

Basic science examinations August 28. Applications must be filed 21 days in advance. Address Mr. Casey.

SOUTH CAROLINA

Examinations June 18 at Columbia. Address Ernest A. Johnson, D.O., secretary-treasurer, State Board of Osteopathic Examiners, Box 525, Summerville.

SOUTH DAKOTA

Professional examinations July 16-17 at Rapid City. Applications must be filed by July 1. Address Mr. John C. Foster, Executive Secretary, Board of Medical and Osteopathic Examiners, 300 First National Bank Bldg., Sioux Falls.

Basic science examinations June 7-8 at Medicine and Science Building, University of South Dakota, Vermillion. Applications must be filed by May 24. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, 310 E. 15th St., Yankton.

TENNESSEE

Professional examinations August 8 at the Hermitage Hotel, Nashville. Applications must be filed by July 15. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

Basic science examinations given every 3 months. Address O. W. Hyman, M.D., Secretary, Board of Basic Science Examiners, 874 Union Avenue, Memphis 3.

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Hyoscyamine Sulfate	0.3111 mg.	0.3111 mg.
Atropine Sulfate	0.0582 mg.	0.0582 mg.
Hyoscine Hydrobromide	0.0195 mg.	0.0195 mg.
Phenobarbital	48.6 mg. (¾ gr.)	48.6 mg. (¾ gr.)

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TEXAS

Examinations June 24-26 at the Texas Hotel in Fort Worth. Applications for examination must be filed by June 14. Applications for reciprocal licensing must be filed by May 24. Address M. H. Crabb, M.D., secretary, Board of Medical Examiners, 1714 Medical Arts Bldg., Fort Worth 2.

VERMONT

Examinations in June. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Building, Rutland.

WASHINGTON

Professional examinations July 15-17 at the School of Medicine, University of Washington in Seattle. Applications must be filed by July 1. Address Mr. Edward C. Dohm, secretary, Professional Division, Department of Licensure, Olympia.

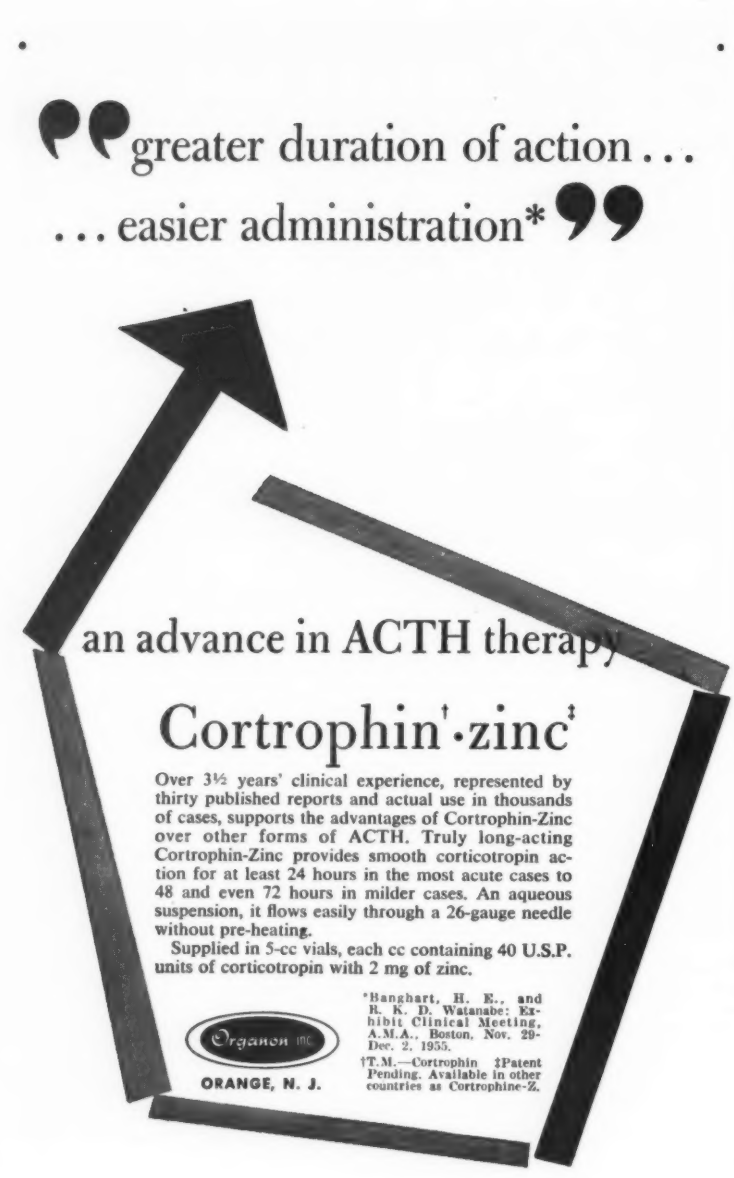
Basic science examinations July 10-11 at the School of Medicine, University of Washington in Seattle. Applications must be filed by July 1. Address Mr. Dohm.

WEST VIRGINIA

Examinations June 17-18 at Daniel Boone Hotel, Charleston. Applications must be filed by May 15. Address Theodore L. Sharpe, D.O., secretary, Board of Osteopathy, 212 W. Burke St., Martinsburg.

WISCONSIN

Professional examinations July 9-10 in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*Banghart, H. E., and R. K. D. Watanabe: Exhibit Clinical Meeting, A.M.A., Boston, Nov. 29-Dec. 2, 1955.
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ORANGE, N. J.

Before June 30—Delaware, $20.00. Address Joseph S. McDaniel, M.D., secretary, Board of Medical Examiners, 229 S. State St., Dover.

June 30—Virginia, $1.00. Address K. D. Graves, M.D., secretary, Board of Medical Examiners, 631 First St., S.W., Roanoke.

On or before July 1—New Mexico, $5. Address H. E. Donovan, D.O., secretary, Board of Osteopathic Examination and Registration, Donovan Osteopathic Hospital, Raton.

July 1—Idaho, $10. Address Margaret Gilbert, Director, Bureau of Occupational Licenses, Room 354, State House, Boise.

July 1—Kansas, $10. Address C. A. Welker, D.O., secretary, Board of Osteopathic Examination and Registration, J. C. Penney Bldg., Concordia.

July 1—Michigan, $5. Address P. Ralph Morehouse, D.O., assistant secretary, Board of Osteopathic Registration and Examination, 214 S. Superior St., Albion.

July 1—North Dakota, $3. Address G. L. Hamilton, D.O., secretary, Board of Osteopathic Examiners, Ringo Bldg., 119 S. Main St., Minot.

July 1—Oklahoma, $2. Address G. R. Thomas, D.O., secretary, Board of Osteopathy, 1100 N.W. 36th St., Oklahoma City 18.

July 1—West Virginia, $2. Address Theodore Sharpe, D.O., acting secretary, Board of Osteopathy, 212 W. Burke St., Martinsburg.

July 1, with 60 days following—Indiana, $5 residents, $10 non-residents. Address, Miss Ruth V. Kirk, executive secretary, Board of Medical Registration and Examination, 538 Knights of Pythias Bldg., Indianapolis 4.

Milwaukee. Address E. C. Murphy, D.O., Board of Medical Examiners, 438 Gilbert Ave., Eau Claire.

Basic science examinations Saturday, June 1, at Milwaukee. Applications must be filed by May 24. Address Mr. W. H. Barber, secretary, Board of Examiners in the Basic Sciences, Ripon College, Ripon.

WYOMING

Examinations June 3 at Cheyenne. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, New State Office Building, Cheyenne.

ONTARIO

Examinations June 13-15 at Toronto. Applications must be filed by May 20. Address D. Gordon Campbell, D.O., secretary, Board of Directors of Osteopathy, Drugless Practitioners Act, 2 Bloor St., E., Toronto 5, Ontario.

Reregistration of osteopathic licenses

During June—Hawaii, $5, residents, $2 for non-residents. Adress Frank O. Gladding, D.O., secretary-treasurer, Board of Osteopathic Examiners, 504 Kauikeolani Bldg., Honolulu 13.

Examination by National Board

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the parts to be taken, must be in the secretary's office by the November 1 or April 1 preceding the examination.

Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in

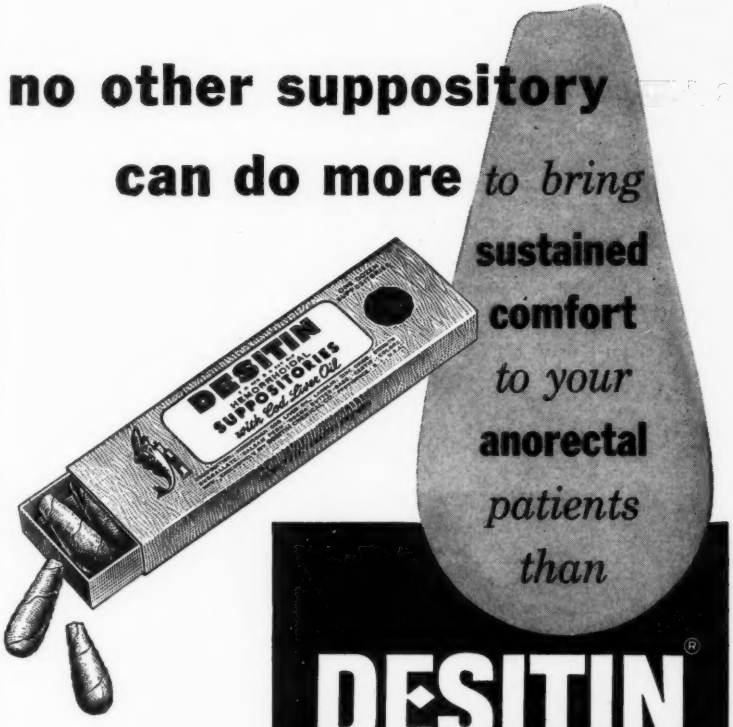
surgery, including applied anatomy, surgical pathology, and surgical specialties; neurology and psychiatry; public health, including hygiene, medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are anatomy; physiology; pathology; osteopathic principles; therapeutics, and pharmacology; surgery; ophthalmology and otorhinolaryngology; obstetrics and gynecology; physical and clinical diagnosis; public health and communicable diseases.

These are oral examinations which the candidate may take after having satisfactorily completed the first 6 months of a 1 year internship in a hospital approved by the American Osteopathic Association for intern training. Part III is given annually at the Philadelphia, Kirksville, and Los Angeles colleges.

Eligibility requirements are as follows: Part I, satisfactory completion of the first 2 years in an approved school of osteopathy; Part II, satisfactory completion of Part I and of the first two quarters or trimesters of the senior year in an approved osteopathic college; Part III, satisfactory completion of Part II and at least 6 months of a 1-year internship approved by the American Osteopathic Association. The internship requirement does not apply to candidates who took Part I prior to July, 1950.

Applications must be filed with the secretary of the Board not less than 30 days prior to the examination dates. Address Paul van B. Allen, D.O., secretary, 1512 N. Delaware Street, Indianapolis 2.



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Specialty board examinations

ANESTHESIOLOGY

Examination October 26, 9:00 a.m., Sheraton-Jefferson Hotel, St. Louis. Address Crawford M. Esterline, D.O., secretary, American Osteopathic Board of Anesthesiology, P.O. Box 155, Kirksville, Mo.

INTERNAL MEDICINE

Written and oral examinations September 22-23 at the Hotel del Coronado, Coronado, Calif. Applications must be filed before April 1. Address Glennard E. Lahrson, D.O., secretary-treasurer, American Osteopathic Board of Internal Medicine, 460 Staten Ave., Oakland 10, Calif.

NEUROLOGY AND PSYCHIATRY

Oral examinations in November, written tests in February, and clinical examinations in May or June. Applications must be filed no later than October 1. Address Thomas J. Meyers, D.O., secretary-treasurer, American Osteopathic Board of Neurology and Psychiatry, 234 East Colorado St., Pasadena 1, Calif.

PATHOLOGY

Examination July 12, 9:00 a.m., Dallas Osteopathic Hospital, Dallas, Tex. Address Norman W. Arends, D.O., secretary, American Osteopathic Board of Pathology, 13119 Sherwood Drive, Huntington Woods, Mich.

PEDIATRICS

Examinations July 9-12 in Dallas, Tex. Address Evangeline N. Percival, D.O., secretary, American Osteopathic Board of Pediatrics, 1721 Griffin Ave., Los Angeles 31.

PHYSICAL MEDICINE AND REHABILITATION

Examinations July 12-13 in Dallas, Tex. Address Robert C. Ruenitz, D.O., secretary-treasurer, American Osteopathic Board of Physical Medicine and Rehabilitation, 3122 W. Vernon Ave., Los Angeles 8.

PROCTOLOGY

Examination July 13 in Dallas, Tex. Address Carlton M. Noll, D.O., secretary, American Osteopathic Board of Proctology, Box 47, Evergreen, Colo.

RADIOLOGY

Examinations October 25-26 in St. Louis. Address D. W. Hendrickson, D.O., secretary, American Osteopathic Board of Radiology, 3429 East Douglas Ave., Wichita 8, Kans.

SURGERY

Examinations October 26-27 in St. Louis. Applications for examination in specialty fields of surgery, gynecological surgery, neurosurgery, orthopedic surgery, peripheral vascular surgery, plastic surgery, urological surgery must be received prior to April 1. Address Mrs. E. F. Martin, corresponding secretary, American Osteopathic Board of Surgery, P.O. Box 474, Coral Gables, Fla.

Unprecedented population gain*

Breaking all previous records, the population of the United States increased by 2,900,000 during 1956, bringing the total, including the Armed Forces overseas, to 169,670,000 at the end of the year. In the 11⅓ years since the close of World War II, almost 29½ million people have been added to our population—more than the total gain during the 23 years between the two world conflicts.

The unprecedented population growth in 1956 reflects an increase in births to the highest level in our history. There were about 4,200,000 births during the year, compared with 4,091,000 in 1955 and 4,078,000 the year before. The births in 1956 correspond to a rate of 25.1 per 1,000 population residing in the United States. For 11 years now the birth rate has exceeded 24 per 1,000.

The baby crop of 1956 also set a new mark in another respect—its success in overcoming the hazards of early life. Infant mortality for the year dropped to a new low of about 26.2 per 1,000 live births, thus continuing the long-term progress which has been made in conserving the lives of babies. This rate is about 1 percent less than the previous low established in 1955, and one fourth under that of a decade ago.

On the whole, health conditions were very favorable during 1956. However, due largely to the increasing proportion of older persons in the population, mortality rose slightly for the second year in succession. In 1956 the death rate for the total population was 9.4 per 1,000, compared with 9.3 in 1955 and with the all-time low of 9.2 per 1,000 recorded the year before. The total number of deaths increased by more than 40,000 annually in the past two years, reaching a record high of about 1,570,000 in 1956.

The number of births exceeded deaths by an unprecedented margin. The natural increase in our population amounted to about 2,630,000 for the year; it was about 2,564,000 in 1955 and 2,597,000 in 1954, the previous high. Our country also gained about 275,000 persons through migration during 1956, or several thousand more than in each of the preceding four years.

The population residing in the United States increased by 1.8 percent in 1956. Every geographic area of the country shared in this growth, with the Far West showing the largest rate of population increase, namely, 3.2 percent. This was not much below the annual rate during 1950-1955 and almost double that for the country as a whole. California has gained about 3.1 million inhabitants since the 1950 Census—more than any other State. Its population now numbers close to 13.7 million, and is exceeded only by that of New York State.

The Rocky Mountain States, particularly Nevada and Arizona, have been experiencing a vigorous rate of growth, as is evident from the accompanying table. Arizona now has over 1,000,000 residents, and Nevada has passed the quarter million mark.

Four States outside the West have also had a rapid population growth. In Florida, the gain has averaged 5 percent annually, the population rising from 2,771,305 in April 1950 to about 3,858,000 at the end of 1956. Increases well above the rate for the United States as a whole have also been registered in Delaware, Maryland, and Michigan.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, December 1956.

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Pacific Coast Branch
981 Eleventh St., San Francisco, Calif.

Population losses since the 1950 Census have been sustained in five States. The number of residents has decreased by 100,000 in Arkansas and by about 56,000 in Mississippi. Smaller declines have occurred in West Virginia, Vermont, and Maine.

Although the year to year increases in population have been mounting during the postwar period, it is unlikely that the annual increases in the near future will equal the gain in 1956. Even so, by the time of the 1960 Census, our population, including the Armed Forces overseas, may reach 178½ million. In that event, the present decade will show an increase of about 27⅓ million, or two fifths more than during the 1940's, which up to that time had the greatest gain for a 10-year period.

Rise in motor vehicle accident fatalities*

Thus far in 1956, the death toll from motor vehicle accidents in the United States has risen to an unprecedented high level. Unless the closing months of the year make an unusually favorable showing, the loss of life in such accidents may rise to over 40,000, compared with 38,426 deaths in 1955 and 35,586 the year before. According to present indications, even on the basis of miles traveled, the motor vehicle accident death rate for 1956 may be somewhat above the corresponding rate for 1955, which recorded a slight increase from the preceding year. In the past there was some solace in the fact that the death toll per 100 million vehicle miles was decreasing, but this has not been the case in the last two years.

The attack on the motor vehicle accident problem obviously needs to be intensified, particularly in those segments of the population where the problem is most acute. Males are far more frequently the victims of such accidents than females. Among white persons insured under Industrial policies in the Metropolitan Life Insurance Company, the motor vehicle accident death rate is fully three times as high for males as for females at ages 1-74, averaging 25.4 and 8.1 per 100,000 for the two sexes, respectively, in 1953-55. Males record the higher mortality at every age period, the sex difference increasing sharply from childhood through the early 20's, when the death rate for males is more than 7 times that for females; thereafter, however, the difference diminishes.

Age 21 marks the peak in mortality from motor vehicle accidents among white males in this insurance experience. The death rate in 1953-55 rose sharply from less than 10 per 100,000 among boys at ages 1-14 to 64.1 per 100,000 at age 21. Even though the mortality decreased beyond that point, it was still above 50 per 100,000 at age 23, or at the same level as for 18- and 19-year-old boys. The relatively high motor vehicle accident death rate among males in the late teens and early 20's may reflect, in large measure, frequent disregard of safe driving practices. The sharp rise in the rate for older people, however, is due in considerable degree to their inability as pedestrians to cope with current traffic conditions.

Among females, the age distribution of mortality from motor vehicle accidents is quite different from that among males. One point of variance is that females experience a comparatively gradual rise in the death rate during the teen ages; secondly, a peak is reached at age 18, three years below that for males. Thus, the motor vehicle accident death rate among white female policyholders in 1953-55 rose from about 5 per 100,000 at ages 1-14 to little more than 13 per 100,000 at age 18. It then tended downward with advance in age until later life; at ages 65-74 the mortality rose to 16 per 100,000, higher than for any other age group.

In both sexes, drivers and passengers comprise the large majority of motor vehicle accident victims throughout the

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, Nov. 1956.

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greater part of life. In fact, the only exceptions are young children and older people; but even among them, pedestrians account for not much more than half the total fatally injured. Among insured males in the age range from 16 through 29, drivers and passengers constituted more than 90 percent of the victims; at age 21—where the peak mortality from motor vehicle accidents is recorded among males—the proportion was no less than 97 percent. Although the level of mortality for females is consistently below that for males, the general age patterns are the same for both sexes, unlike the situation for total motor vehicle accident fatalities.

In meeting the challenge of the motor vehicle accident problem, special attention needs to be focused on the prevention and correction of faulty driving habits, which are responsible for a large proportion of traffic fatalities. Driver education courses being given in many high schools throughout the country should help to develop a large corps of safe operators, but the program needs to be extended to include persons in the early 20's. Much could also be accomplished by an improvement program for drivers, particularly for those who are frequent violators of traffic rules or accident repeaters. Licensing should be more selective and, of even greater importance, traffic laws should be enforced more rigorously. It is urgent that the American people participate in the current campaign to Back the Attack on Traffic Accidents.

Rapid gains in the control of syphilis*

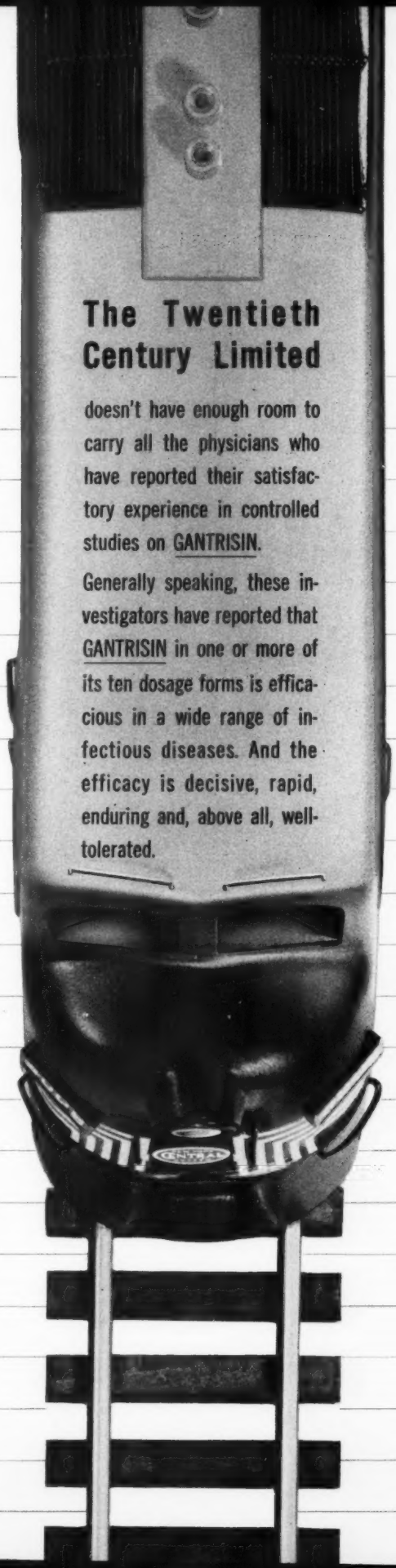
Both the mortality and morbidity due to syphilis have been decreasing rapidly since the end of World War II, following the demonstration that penicillin is highly effective in the prevention and treatment of the disease and its complications. In 1954, the recorded death rate from syphilis in the United States was 3.0 per 100,000, compared with 8.4 only 10 years earlier, a reduction of more than 60 percent. Preliminary figures for 1955, moreover, show a further decline. Especially striking has been the downward trend in the mortality from congenital syphilis, which is only about one twentieth what it was a decade ago. In the entire country, there were only 42 deaths from this cause among infants in 1954.

Recent reductions in syphilis mortality have been large throughout adult life in each of the color-sex groups. Based upon experience among persons insured under Industrial policies in the Metropolitan Life Insurance Company, between 1946-50 and 1951-55, the syphilis death rate at ages 35-44 dropped four fifths among white persons and nearly three fourths among the nonwhite. Although the relative decline decreased with advance in age, it still exceeded two fifths at 55-64 years. The effect of the differences in the rate of decline by age is to concentrate to a greater extent the mortality from the disease at the older ages.

Marked changes have also occurred in the proportion of deaths resulting from the various complications of the disease. Cardiovascular syphilis, although recording a decrease in death rate, has been accounting for an increasing proportion of the total mortality from syphilis. In 1951-55, the deaths with cardiovascular complications constituted the majority of deaths from syphilis in practically every age group, and as much as three fourths of the deaths among white males in the age range 55-74. In contrast, deaths from syphilis with central nervous system complications have diminished as a proportion of the total.

Hospital records likewise indicate that the morbidity and mortality from syphilis of the central nervous system have been decreasing. In the country as a whole, the rate of new admissions to mental hospitals for such cases fell about two thirds between 1931 and 1951. Data available for one large hospital showed that the proportion of such patients dying within three years of admission dropped from 41 percent for first admissions in 1936-45 to 22 percent for admissions in

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, Nov. 1956.



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Azo Gantrisin is an antibacterial-analgesic agent specifically designed for treatment of urinary tract infections. The high plasma and urine levels of Gantrisin act systemically and locally to clear both descending and ascending infections. Painful burning, urgency and nocturia are relieved – often within 2 hours – by the analgesic action of phenylazo-diamino-pyridine HCl upon the mucosa of the lower urinary tract.

USES:
For antibacterial therapy and local pain relief in urinary tract infections; prevention of infection after cystoscopy, catheterization and other instrumentation. Also useful after urologic surgery.

ADVANTAGES:
Wide antibacterial spectrum . . . high plasma levels . . . high urine levels . . . high solubility (even in acid urine) . . . no need for alkalies . . . no likelihood of renal blocking . . . local pain relief.

DOSAGE:
Adults (and children over 100 lbs) – 2 tablets, q.i.d.
Children under 100 lbs – 1 tablet, q.i.d.

Caution: The usual precautions in sulfonamide therapy should be observed. Because Azo Gantrisin contains phenylazo-diamino-pyridine HCl, it is contraindicated in glomerular nephritis, pyelonephritis of pregnancy with gastrointestinal symptoms, severe hepatitis and uremia. In such cases, Gantrisin should be used alone.

SUPPLIED:
Red, monogrammed tablets, each containing 0.5 Gm Gantrisin plus 50 mg phenylazo-diamino-pyridine HCl; bottles of 100 and 500 tablets.

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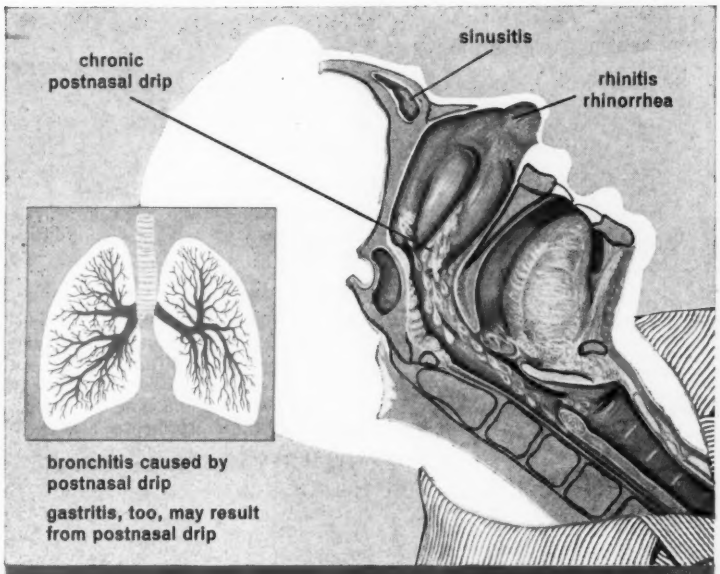
1946-50.† According to the experience of mental hospitals in New York State, an increasing proportion of the deaths among patients with syphilis of the central nervous system has been due to non-syphilitic disease, especially chronic circulatory disorders and cancer.

In recent years, a major factor in the control of syphilis has been the use of antibiotics, which has proved effective not only in ameliorating the central nervous system and cardiac complications of the disease, but also in curing early syphilis. It should be recalled, however, that syphilis mortality had been decreasing long before the introduction of antibiotic therapy, indicating that the earlier methods of treatment with chemicals were probably more effective than is generally realized. Part of the credit for the reduction in the incidence of syphilis is due the educational campaign directed particularly at young people by official and voluntary agencies with the support of popular media of communication.

It would be most unfortunate if the progress made in the control of syphilis engendered a feeling of complacency about the disease and blunted the campaign against it. Overconfidence appears to be developing in the use of antibiotics as the sole means of controlling the disease. Considerable reductions are being made in expenditures for case finding and follow-up, and for education in this field. According to recent estimates, there are nearly 2,000,000 persons in our country requiring treatment, and more than 85,000 new cases annually. Disability from the late manifestations of the disease is still considerable. It is clear that syphilis remains an important public health problem.

†Kramer, M., et al., Dispositions of First Admissions to a State Mental Hospital. Public Health Monograph No. 32, Public Health Service, 1955.



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And because of its prolonged action Triaminic is especially valuable for nighttime relief.

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*Smith-Dorsey clinical research files.

Each Triaminic "timed-release" Tablet contains:

phenylpropanolamine HCl	50 mg.
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Dosage: one tablet t.i.d.

Bottles of 50 and 250 "timed-release" tablets.

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The specially constructed outer layer and inner core each contain equal doses of a decongestant together with two antihistamines.

The outer layer dissolves within minutes giving approximately 3 to 4 hours of action. Then the inner core disintegrates to give 3 to 4 more hours of relief.

Triaminic® *tablets*

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Accidental poisoning in recent years*

The death rate from accidental poisoning by solids and liquids in the United States decreased steadily from 11.0 per million population in 1949 to 8.3 in 1954, then increased slightly to 8.7 in 1955, the latest figure available.

This recent rise reflected largely the increase in fatalities from accidental poisoning by barbituric acid and its derivatives. In 1955 there were 411 such deaths —about 30 percent of the total—compared with 345 in 1954. Actually, the number of deaths from this cause has been increasing since 1952, reversing the trend in the years immediately preceding. It is not clear why, with more stringent restrictions being placed on the sale of barbiturates in many localities, the improvement in mortality recorded from 1949 to 1952 has not continued.

The death toll from drugs and medicines other than barbiturates has not changed appreciably in recent years. In 1955 they accounted for 345 deaths or for one fourth of the total mortality from accidental poisoning in our country. The majority of deaths in this category resulted from poisoning by the salicylates or from overdoses of chloral hydrate, paraldehyde, and other analgesics and soporifics. Strychnine, however, is responsible for relatively few deaths—far less than the toll it took several decades ago.

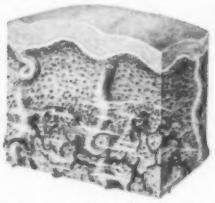
At least one in every seven deaths from accidental poisoning is due to the ingestion of wood, denatured, or other alcohols. Most prominent among the other poisons are petroleum products, lead, and caustic alkalies and acids.

Deaths from accidental poisoning are about 1½ times as frequent among males as among females.

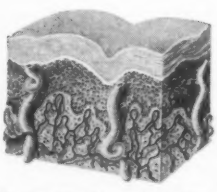
Children under 5 years of age, who constitute little more than one tenth of the total population, account for nearly three tenths of the poisoning fatalities. Preschool youngsters comprise a large proportion of the victims of poisoning from aspirin and other salicylates, kerosene and other petroleum products, insecticides, and lead compounds.

*Reprinted from *Statistical Bulletin*, Metropolitan Insurance Company, February 1957.

Acute inflammation



Note spread of suppuration throughout the tissues and a marked swelling from surrounding edema.



Note regression of edema, swelling and acute inflammation after starting Chymar therapy.

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the newest and SAFEST anti-inflammatory agent

Chymar

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Chymar is a suspension of the proteolytic enzyme chymotrypsin in oil, for intramuscular use.

What it does . . .

Chymar reduces and prevents inflammation irrespective of cause; reduces and prevents edema of inflammatory and traumatic origin; reduces pain; hastens absorption of blood and lymph effusions; restores circulation; promotes healing.

Why CHYMAR is so safe . . .

It causes no undesirable local or systemic reactions; has no known contraindications—no known incompatibilities; has no influence on blood clotting mechanism; does not spread infection, but augments the action of concurrently used antibiotics.

Indications . . . Prophylactic and Therapeutic

Chymar is indicated in all conditions in which inflammation and edema retard healing. 1) *Accidental injuries:* Black eyes, bruises, hematomas, wounds, burns, sprains, fractures, bursitis. 2) *Surgery:* Biopsies, cellulitis, hernia repair, hemorrhoidectomies, G. I. surgery (to prevent edema and hematomas at site of anastomosis), mammectomies, orchitis, epididymitis, prostatitis, phlebitis, thrombophlebitis, skin ulcers (as an adjunct to Tryptar Antibiotic Ointment). 3) *Obstetrics:* Breast engorgement (postpartum), cephalohematoma, episiotomies. 4) *Eye Diseases:* Inflammation, trauma, edema, hematomas (blood in anterior chamber), pre- and postsurgically.

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Psittacosis*

John H. Scruggs, D.V.M., M.P.H.†

The disease we know today as psittacosis was first described in Switzerland in 1879 as pneumotyphus. Early cases of this disease were attributed to association with parrots or parrot-like species, and the etiological agent was believed to be one of the *Salmonella* group. It was not until the pandemic of 1929-30 that the viral nature of the infection was established and the causative virus isolated and identified.

During the pandemic which started in South America in 1929 and rapidly spread to Europe and North America, the Public Health Service invoked stringent foreign quarantine regulations prohibiting the importation of psittacine birds. Few modifications have been made in these regulations during the past 25 years. Regulations controlling the interstate movement of psittacine birds were promulgated several years after the pandemic. During the late 1930's and 1940's these foreign and domestic control regulations were effective in reducing the incidence of human psittacosis in the United States to a low level of 20 to 30 cases a year.

Investigations during the period 1935 to 1950 revealed that psittacosis is a ubiquitous disease. Infection was recognized in more than 70 species of wild and domestic birds and mammals. The human case fatality rate, which had been 20 percent during the pandemic, dropped to less than 1 percent with the use of the broad spectrum antibiotics. These factors and the low number of reported human cases of the disease were considered by the board appointed by the Surgeon General of the Public Health Service in 1950 to review the Interstate Quarantine Regulations. Since the infection had been shown to be widespread in nature and of minor importance as the cause of human morbidity, it was decided to revise the Interstate Quarantine Regulations to permit shipment of psittacine birds except into those areas where prohibited by State law. This revision in the regulations became effective late in 1951.

The lifting of the restriction on shipment resulted in an unanticipated demand for these birds, particularly parakeets, as household pets. This demand, which exceeded the available supply, activated the establishment of many backyard and basement aviaries. In a number of instances cull birds were used as breeding stock, and the husbandry practices tended to propagate rather than control disease.

The annual incidence of human psittacosis rose from 25-30 cases during the years 1945-50 to 135 in 1952, 169 in 1953, 563 in 1954, and 278 in 1955. The National Office of Vital Statistics reports that during the 23-week period January 1 to June 9, 1956, there were 205 human cases compared with 155 during the same period in 1955. The 205 cases during the first 5 months of 1956 do not include the undetermined number of cases in Oregon which were attributed to association with diseased turkeys.

The term "ornithosis" has been proposed for this infection when it occurs in species of birds other than the psittacines. In human medicine the term "psittacosis" is used to describe infections with this group of viruses without regard to the species of birds or mammals from which it may have been derived.

Although ornithosis has been recognized in chickens, human infections traced to these fowl have occurred only sporadically, and major outbreaks have not been seen. The largest outbreak in which chickens were believed to be the source occurred in 1954 in a rural area in northwestern Illinois. In this episode 37 persons became ill, and serologic evidence revealed psittacosis. No virus was isolated from any of the humans or chickens in the area.

The disease in turkeys and in humans associated with turkey processing was first recognized in Texas in 1948. Five outbreaks of psittacosis with at least 96 cases and 7 deaths occurred among employees of two Texas poultry-dressing

*Reprinted from *Public Health Reports*, Feb. 1957.

†Dr. Scruggs, a Public Health Service Officer, is currently assigned to the New York City Department of Health as veterinary consultant. This paper was presented at the fifth annual health conference of the Pennsylvania State Health Department, University Park, Pa., August 21, 1956.

establishments in 1948, 1951, 1952, and 1953. All the patients had been dressing turkeys for the Thanksgiving or Christmas market or at the end of the egg-laying season. The illness varied in severity from minor influenza-like attacks to severe toxemias ending in death. In 1954, 200 cases of psittacosis were reported among persons working in turkey-processing plants in Texas, and one person died. All of these individuals had taken part in the actual processing of the birds.

A very toxic strain on psittacosis virus was recovered from turkeys in Texas in 1952 and again in 1954. Late in 1954, five human cases occurred in a small turkey-dressing establishment in New Jersey. The New Jersey virus is very similar to that seen in Texas. Epizootiological investigations have not clearly established the source of the infection in turkeys. Ecologic studies of migratory birds have given equivocal results. The virus isolated in Texas is very similar to that isolated from waterfowl on the coast of Louisiana, but a connecting link has not been established.

In September 1955, Iowa reported three human cases of psittacosis among employees of a turkey-processing plant. Serologic studies of the turkeys in this area were negative. However, too few serum specimens were tested for significant results. Serologic specimens collected from turkeys in other areas in the State were positive.

Early in 1955, a psittacosis virus strain was recovered from turkeys in Michigan. A similar strain was recognized in turkeys in California late that year. In each instance there were positive serologic findings. Pathological changes were seen in the birds at post-mortem examination, but no human cases were reported in association with these birds. Virus strains isolated from turkeys in both of these States were of low pathogenicity for mice.

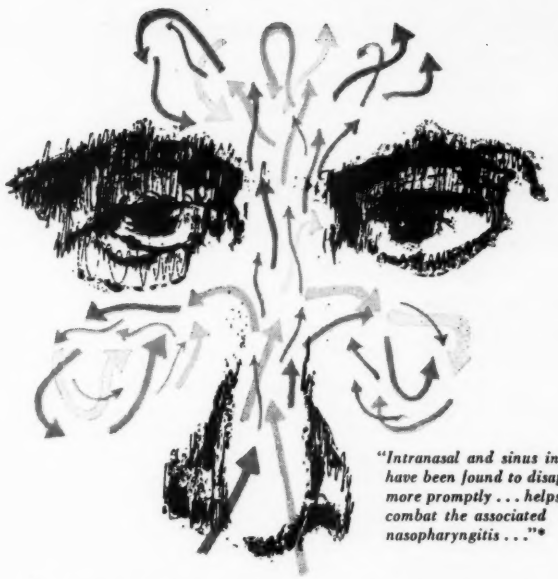
The most recent outbreak of ornithosis in domestic fowl occurred in Oregon in March 1956. Infection was recognized at two turkey-breeding farms near Portland. To date some 50 to 60 human cases have been attributed to contact with these diseased turkeys. Two observations made during the Oregon outbreak which had not been seen in either the New Jersey or Texas investigations were the occurrence of cases among farm workers who had only limited contact with the live birds and the extreme infectiousness of aerosols which can be generated during rendering plant operations. It was found that aerosols in a rendering plant which ground carcasses of diseased birds infected workmen far removed from the actual operation.

Epidemiological and epizootiological investigations of the Portland outbreak are being made. Deaths had occurred in both of these turkey flocks for several months before reaching epizootic levels. Initially, the losses were attributed to bacterial infections, and the flocks were treated with various biological and chemotherapeutic preparations. It was not until an employee on one of the farms developed psittacosis that the viral nature of the infection in the turkeys was suspected.

Ecologic and environmental studies to date have not furnished clues to the factors that either start or support an epizootic in bird populations. Virulent strains of turkey virus have been recovered in areas having widely different topographic and climatic conditions. Avirulent strains have been recovered in areas of epizootic infections. Until we have a broader understanding of the behavior of these viruses, efforts will have to be directed toward control rather than prevention of outbreaks.

Once a disease of animals moves into the human population, it assumes public health significance, and the importance of the disease is determined by the morbidity and mortality it causes, the rapidity with which it moves in a population, and the size of the group at risk. Psittacosis, once an obscure and rare disease thought to be contracted only by persons associated with parrots, has been diagnosed in people who handle other species of birds. Several species of mammals have been shown to be infected and may be the source of human infection.

Although the number of human cases of psittacosis during the period 1951-55 has shown a marked increase over the 1945-50 period, this should not cause alarm. The popularity of parakeets as



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*Spencer, J. T. in Conn, H. F.: Current Therapy 1954, Philadelphia, W. B. Saunders Co., 1954, p. 130.

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References: (1) S. M. Bluefarb, M.D., "The Management of Acne Vulgaris in the 12 to 17 Year Age Group," Postgraduate Med., 19:144, Feb. 1956.
(2) S. W. Becker & M. E. Obermayer, Mod. Dermatology & Syphilology, 2nd edition.

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household pets has resulted in a manifold increase in the number of these birds (estimated increase of from 2 to 12 million) with only a slight percentage increase in the number of cases attributed to this source. Occupational psittacosis may not be increasing but rather may be identified more often as the result of improved methods of diagnosing the disease. Public health workers and clinicians should be on the alert for occupational psittacosis because it may be an unrecognized source of respiratory illness. Current research shows promise of feasible control measures for this disease in both parakeets and turkeys. Prevention of psittacosis in human beings depends on control of psittacosis and ornithosis in the animal population.

Fads and facts as the bases of child-care practices*

Milton J. E. Senn, M.D.†

It is not easy to be objective in evaluating the influences of research, or to predict which investigative work will initiate a new trend. A vast amount of research work is going on, and it is difficult for any one person to be intimately familiar with all of it, even in one's own country. Each of us engaged in research in child development is so busy with his own small project that he cannot keep informed in an adequate fashion about studies elsewhere, nor can he give up the notion that his investigations are pre eminently important not only for the present, but also for the future.

In examining the wider area of research in child development, I have considered as current not only studies of the past year or two, but those produced in the past 10 years. In order to get a historical perspective, I have also examined earlier efforts in child-development research carried on since the turn of the century. This paper will mention first some of the impressions I gained from the historical review.

First, I have been impressed with the fact that trends in child care often do not await scientific evidence for support. The flood of child-care methods based on behavioristic theory carried on in the 1920's and 1930's and the tide of permissiveness in the late 1940's did not develop from the appearance of large bodies of scientific data which had been arrived at by careful research. Instead, they resulted much more as parts of other forces—rebellion at practices of child care which for one reason or another were considered unsatisfactory or injurious. For example, the scheduled and impersonal practices of habit training in the 1920's were part of the impersonality of the scientific methods which flourished at that time and which were so effective in controlling disease. When as a byproduct there developed an unexpected abundance of certain kinds of behavior problems, it was natural that a reaction characterized by self-regulation should begin in the 1940's.

Practices of child care are never isolated from other important, dynamic forces in society; rather they reflect changes taking place in other areas—general economic, cultural, and psychological. Changing patterns of thought about matters which affect our society as a whole influence what we do in the care and education of children in the home, the nurseries, the school, and the church.

The fact that we rear and educate our children by methods based much more on empiricism than on scientific foundations may not be entirely bad. However, it explains the rapid shifts in our practices as well as the misinterpretation and misuse of the small amounts of data which have been gathered. I have the feeling that we could do better if our child-care practices were built on solider findings of scientific investigation. For that reason I am a strong believer in the need for greater support, financially and in every other way, of child-development research in our universities, which should be the ideal places for objective, systematic, and comprehensive evaluation of growing children.

My second discovery which has resulted from a study of the past is that trends

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may develop from either the scientific studies of a few people, or of a single person, or even out of the impressions of a few people, if their beliefs are given wide publicity, are stated forcibly, and are presented to the general public at a time when it is ready to accept them.

STARTING A TREND

For example, the "success formula" for starting a trend, or at least a fashion, in child care would be to choose a subject like adolescent behavior which is puzzling many parents and educators; then to interest a person well known for his work with children to the extent of having him state his opinions about adolescence, even if these are based only on a small sample of observations and clinical impressions. The opinions if presented in writing to an enterprising literary agent will find a ready publisher, and with skillful and abundant pre- and post-publication advertising may not only become the contents of a best seller but find even greater distribution by radio and TV. For the time being, the answer to the riddle of adolescence will seem to have been found; but only until disillusioned parents have learned that the problems of life are not so easily dealt with and until another prophet appears to lead them out of the wilderness.

It is particularly easy today to stir up parents about child-care practices since so many are taking their roles seriously and are buying books and magazines as never before in order to be well informed. As a result, every publishing company of any size has its own line of books on child development and child care. Magazines and newspapers carry articles on these subjects in almost every issue. Unfortunately the demand and the competition are so great that there is often a lack of discrimination in accepting books for publication.

Close scrutiny of books on child development for parents and professional people indicates that writer and written material are usually selected on the basis of what has a ready sale. Material which is palatable, which is considered common sense, and which will not stir up self-criticism, is favored. Since people believe what they want to believe, and read what they want to read, and see what they want to see, they are fed the products of persons who are not always scientifically objective, but who in the name of science, and on the theory that it is bad to stir up parents emotionally, give them what they think parents want instead of what they need.

Thus the public, professional and non-professional alike, has been much more willing to accept as causes of emotional disturbance in children such factors as constitution, body build, physical disease, and single psychological determinants than the deep unconscious mechanisms within the child, or the multiple, mass influence of social forces. We have been as naive in thinking that because a child in infancy has a certain body build he is doomed to a life of delinquency as in believing that the lack of breast feeding predisposes a child to mental disturbance.

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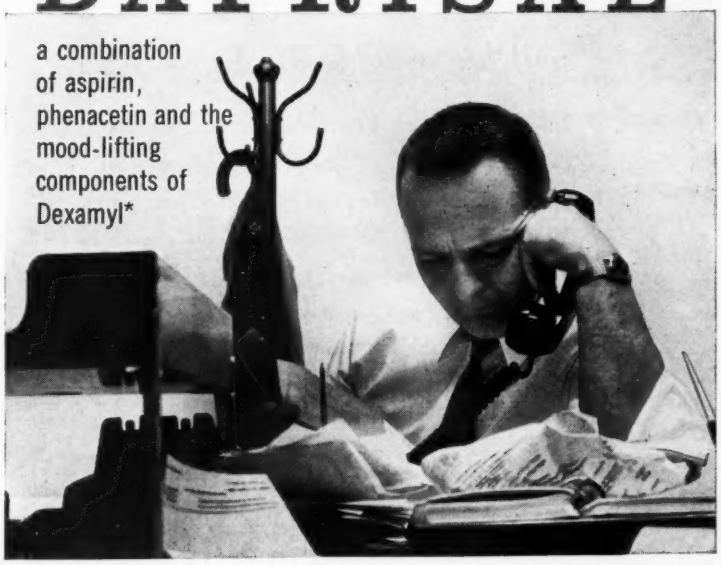

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At the same time we have closed our eyes to what is known about the harmful influences of excessive competition and of general failure to accept human differences, because in our society competition is believed to have a growth-enhancing influence and difference is looked on as pathology.

INFLUENCES ON RESEARCH

This brings me to another discovery in my search for a historical perspective, which is that the findings of research on child development may have a delayed influence on child care. A great part of current research is still influenced by an important body of clinical studies on adults and a few children and a vast collection of theoretical formulations on personality development made over 50 years ago. I am referring, of course, to the psychoanalytical work and theories of Freud.

It took a long time for Freud's writing to be widely read with sympathetic understanding. But today few social scientists will dispute the importance of the emphasis placed by psychoanalysis upon childhood experiences as precursors in the formation of personality. However, despite their ready acceptance of this relationship, most social scientists and psychiatrists see a need for a continuous and critical examination of the ways in which early-life experiences affect later behavior. This is the reason why much of the reasearch in child development today is directed toward test-

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ing out and evaluating psychoanalytic theory, especially with detailed long-term studies of groups of children.

Freud was neither the first nor the last to see the advantages of long-term observation. Excellent observers, both past and contemporary, from Charles Darwin[1] to the psychologist Piaget[2] of Geneva, have recorded observations over several years on their own children. One of the marked characteristics of current research in child development is that it has a long-term, or longitudinal, element. Modern investigators are interested in observing the same children, beginning with their prenatal existence, for as many years as possible, on as many occasions as feasible, by as many different observers as practicable.

Another characteristic of current research is its multiprofessional and interprofessional nature. Psychologists, pediatricians, sociologists, anthropologists, psychiatrists, public-health personnel, and schoolteachers are joining together in such studies. But they are not only studying the child in isolation through a one-way vision screen or in an interview or through a test. To these traditional approaches, they are adding techniques which bring them data about the child living in a family, going to school, and playing with others.

While research workers continue to be interested in the influence of the child's state of health at birth on his later development, they are focusing more sharply today than ever before on the physical and biologic equipment of the newborn. They are examining individual differences of babies at birth in the light not so much of deviancy or potential pathology, as of normal variation, an important sign of individuality and of the child's potentiality for healthy development and behavior.

Although the spotlight of study centers on the individual, its range includes his ever-expanding environment. However well or poorly endowed the human individual may be at birth, either because of biologic inheritance or other constitutional factors, the moment he enters the world there begins an increasingly intensified interaction between him and many forces outside of himself. Preeminent among these are people—first his parents, his siblings, and other members of his family, and eventually others such as physicians, nurses, educators, theologians, recreation leaders, and playmates. Physical forces in the environment along with social, economic, and cultural forces also continue to influence and to modify him. The degree and direction of their influence, for harm or for good, are some of the concerns of current investigators. As more and more is known about human heredity and the chemical-physical elements of genic influence, more will be known about the prevention of physical as well as psychological pathology; but this is probably pointing more in the direction of research for the future than of today.

Child-development research is broader and more comprehensive today than heretofore. The goal of the investigator has also changed.

Since the turn of the century, child psychologists have gathered a myriad of facts about behavior which they have put into encyclopedic books for parents and professional colleagues, stringing one fact after another on a thread of chronological age. The subjects studied were usually so-called "normals" whose growth was charted by birth dates. The reports were purely descriptive with only rare speculation about the whys and wherefores of the behavior noted.

Today, the meaning of behavior is the chief concern of the investigator. Behind this is the belief that the appraisal of behavior in terms of normality and pathology, as well as the prevention and treatment of behavior problems, will be more likely to be successful if based on a proper understanding of the dynamics of behavior. Perhaps, if parents and educators are helped to reason about phenomena rather than to try to match a child against a set of so-called developmental norms, they will, like the researchers, become more knowledgeable about child development and happier in their use of their knowledge.

SOME FINDINGS

What are some of the findings of current research which might have practical value to parents and to professional persons working with children? I can here present only a few.

Probably the most important single finding, which has come out of many

studies, is the demonstration of the variety of normal differences in human beings. "Normal" babies differ greatly from each other at birth as do "normal" children of every age.

Present-day research is re-enforcing concepts about the role of the unconscious in human behavior. It is also verifying the existence of a psychological defense system, built into each healthy person, which protects him from excessive vulnerability to the many stressful situations encountered daily. The origin of these mechanisms seems to be in early childhood and to revolve particularly around the parent-child relationships. From this it becomes evident that any efforts toward making his early relationships stable will help the child establish clear concepts of himself and of other persons. As he is supported and accepted by loving parents he will learn to share this love with others. As the child grows, participation in group life outside the family will further assist him to gain understanding of himself and others and help him cope with frustrations which confront him as an individual and as a member of a group.

Longitudinal studies, especially those of Macfarlane[3] at the University of California, demonstrate that normal run-of-the-mill children of a white, middle-class group in our generation show many characteristics of behavior which parents consider problems, but which in themselves are not indicative of mental pathology. The traits commonly found in these normal children were enuresis, speech difficulties, temper outbursts, nail-biting, transitory lying and stealing, fears, thumbsucking, restless sleep, physical timidity, irritability, jealousy, overdependence, food-finickiness, and sex play. In other words, all traits which may represent mental illness in adults and children appear at one time or another as normal characteristics in childhood. The diagnosis of neurotic disturbance may only be inferred if a given child has an overabundance of any of these traits at one time or if any of them are unsually prolonged, particularly if they interfere in the child's development or result in his failure to participate satisfactorily in the life of his age group.

The findings show, however, that while these traits do not represent a problem to the child or bring him any concern they do bother his parents. This has led pediatricians, teachers, and other professional workers to realize that whether or not a behavioral trait is pathological it is a problem requiring attention as long as it causes somebody to be anxious and to worry. The person who needs direct assistance or therapy is the person who is worried, usually the parent. This has led to a redefinition of the role of professional persons concerned with children, requiring them to provide psychological help to persons who are anxious. However, since the number of persons who ask for help with such problems is great, attempts at group therapy and group education have become increasingly necessary.

Other research workers have pointed out also that not only do behavioral traits come and go in the life of a child because of his nature as a changing and growing human being, but that social class and other cultural influences are often responsible for the differences in behavior among children of various groups. Child behavior which is encouraged and rewarded by one social class may be worried about, disapproved and punished by another. Therefore professional persons appraising both the normality of a trait and methods of dealing with it must take into consideration the cultural background of the child.

In line with this the researchers have found that children's preferences for leisure-time activities vary with their social background. Even if a child lives in a neighborhood or goes to a school including children from several social classes, his recreational interests are likely to attract him to peers of similar social background. One study, for example, found that half of the children from upper middle-income families in a certain city belonged to the Boy Scouts, while almost none of those from low-income families were members. "Middle-class" children went to church more, read more books, spent more time listening to the radio, and were somewhat restricted in movie attendance. "Lower-class" children, on the other hand, went to movies frequently but did relatively little reading or radio listening.

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ABOUT PREDICTION

We have learned to be more cautious in predicting behavior. For example, longitudinal studies which began with detailed analyses of pregnant women have in the past occasionally predicted prenatally that some of the subjects would be poor risks as mothers. To the consternation of the investigators, it was subsequently demonstrated that some of the women who had seemed destined to fail in the mothering relationship turned out to be the most effective and happiest, while others who had seemed sure successes had difficulty in the day-by-day care of their children. Predictions about the behavior of the children proved equally fallacious. Some children who when small seemed unusually dependent and clinging, later when the time came for them to go to school showed little hesitancy about separation from their mothers. This does not mean that prediction is completely invalid, but that the possibility of change in a human being is so great that errors of prediction are frequent.

Other findings have to do with the relationship of physical development and general health to emotional adjustment, intelligence, and school performance. Today wide variations in rates of physical growth and in body size are accepted as normal. However, while the fact has long been known that certain types of mental deficiencies, such as cretinism, are accompanied by arrested physical growth, only recently has a relationship between physical and mental development in healthy children been demonstrated. Two studies of this subject have indicated that intellectually gifted children not only rank higher in school grades and in achievement-test scores but also tend throughout the growth period to be superior in physical development.

Such a positive relationship between physical status and intelligence may be explained in a number of ways. For example, it is possible that intelligence and development are positively correlated because they are both results of the same genetic factors. However, it is also possible that environmental factors, such as a family with adequate financial resources, provide advantages which are stimulating both physically and intellectually—such as good diet, proper medical care, interesting books and toys, and space enough for privacy.

Current research has given much attention to the problems of juvenile delinquency. While many data have been collected, some of them very controversial, one particular study stands out as revealing a way toward prevention. A group of psychologists under the direction of Roger Barker studied children and parents of a small town in the Middle West.[4] After following their human subjects closely day after day at home, at play, and at school, they reported that in this community the children were on the whole relaxed and healthy, lived at a comfortable tempo with time to explore and master their environment, and received a great deal of warm, encouraging companionship from adults. In this community delinquency was unknown.

CHILD-CARE PRACTICES

In our country the child came to society's serious formal attention first as an object to be protected legally and spiritually. With the rise of science, attention focused on him as an object for study, first of his physical self, then of his intelligence and learning, and then more recently of his emotional and social development. It would be hazardous to predict what influence present-day research in child development will have on child-care practices. To some extent the future is in the research workers' hands. Yet human beings are constantly being swept along by forces which have little or nothing to do with science.

At the present time evidence is mounting to indicate that child-care practices are turning away from the permissive approach toward the opposite extreme of coercion. Trends in infant feeding are turning again in the direction of regular, rigidly held schedules. And while the public is told that it must "love or perish," parents are warned against giving too much love. Schoolteachers are advised to go back to teaching the three R's, and to give up the "frill" of child guidance. Recently a county supervisor in Ventura, Calif., during a discussion of a proposal for employing a psychiatrist for the school system, suggested that "it would be a lot cheaper to buy

switches for the teachers." The supervisors failed to order the switches, but neither did they take any action in regard to the psychiatrist.

It is quite likely, one at least hopes, that despite the shift away from the kind of permissiveness based on the individual needs of human beings, all the gains made in that direction in the past several years will not be lost. At least we can still find this recipe for "preserving" children in a popular cookbook:

1 large grassy field
6 children
3 small dogs
A narrow strip of brook with pebbles
Flowers
A deep blue sky

Mix the children with the dogs and empty into the field, stirring continuously. Sprinkle the field with the deep blue sky and bake it in a hot sun. When the children are well browned they may be removed. They will be found right for setting away to cool in a bathtub.

All the ingredients are not always available, but it is the philosophy that counts.

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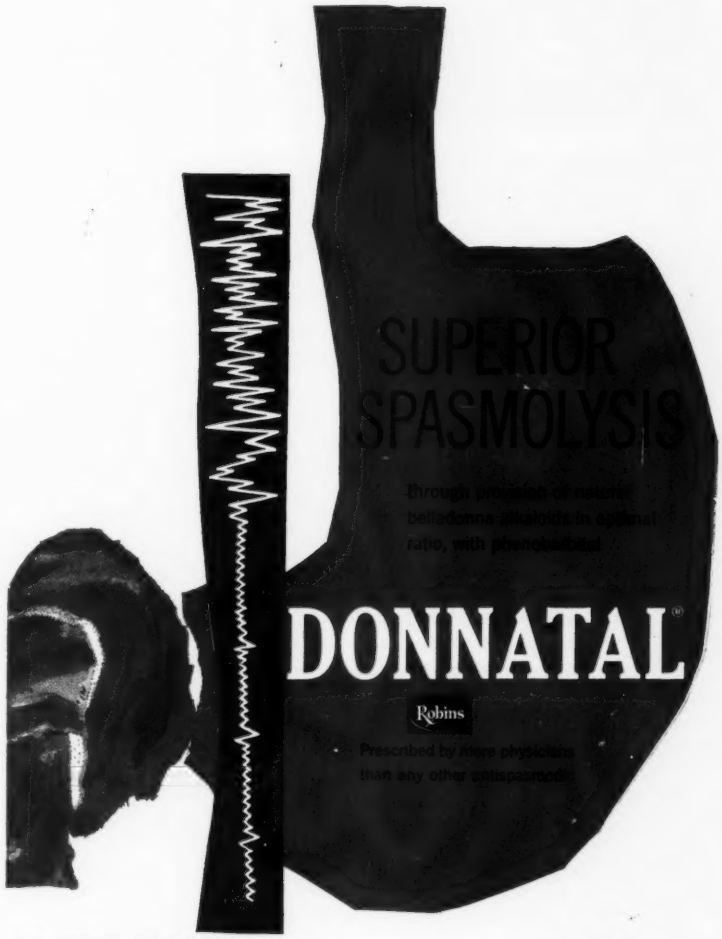

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Social factors in assessing treatability in child guidance*

Saul Hofstein, D.S.W.†

Separation of social factors from the intrapsychic dynamics involved in the selection of cases for treatment in child guidance constitutes a most difficult task. A child, whatever inner forces or conflicts give rise to his need for treatment, expresses his anxiety through his behavior within his family and in other social relationships. Whatever clinical criteria may be established for success in treatment, the community measures its effectiveness through the child's ability to function better within the community. Similarly, the child's problem, whatever its inner expression, represents, in part, an internationalization of factors in his social relationships. Since the child is in an ongoing and close interaction with his parents, his siblings, other family members, school, and community, all of these vectors of his social relationships, have a continuing effect upon him as he undergoes treatment while he, in turn, has a continuing impact upon them. These factors are inherently involved in any attempt to change either the child or his environment.

It is almost impossible to separate out any one set of factors in human dynamics and to examine them independently. Nevertheless, the tendency in child-guidance literature, until quite recently, has been to emphasize solely the therapeutic process with the child and to give relatively scant attention to the various social factors acting upon him. Consequently, in this paper the social factors involved in the determination of treatability will be stressed. Full understanding of such factors must depend upon an equally full understanding of the child's personality, the level of his development, and the dynamic factors involved in his present functioning.

The importance of social factors emerges as we examine the nature of the

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†Assistant Director, Infants Home of Brooklyn, formerly Supervisor of Children's and Youth Services, Jewish Community Services of Long Island.

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illness or deviation which brings the child to the clinic. There was a period in the history of child guidance when we believed that the discovery of the cause of a child's deviation would lead us to the cure. We tended, too, to seek for a single cause. As we frequently found the cause in a disturbance at an early point in the child's developing relationships to his parents, we took from this the direction of our therapy. Redirect the child's attitudes, remove the factors blocking his relationships, reestablish the balance and controls among the personality components, and cure would be effected. But the cure we sought was and still is evanescent in at least one of every three of our patients and often in two of three. There has been a remarkable consistency in these percentages in evaluatory studies whether of casework or psychotherapy, regardless of the theoretical orientation of the therapy.[1]

Most frequently the multiple social factors contributing to an illness have been neglected.

Medical pathologists have been increasingly questioning the concept of single causation even in analyzing diseases which have been found to relate to a particular microorganism. The principle of multiple causation and interrelation between individual and environment holds even more strongly in the etiology of emotional illness.

CULTURAL DIFFERENCES

The same personality structure or pattern of behavior may be considered pathological in one culture and valued by another. The work of the cultural anthropologists has amply demonstrated this point, but few studies have been made of the variations among families within a culture in their capacities to tolerate various degrees of deviational behavior or even pathology. Yet clinical experience has shown how wide these variations may be. One family finds any degree of aggressiveness intolerable, and loses no time in bringing an aggressive child to the clinic. A second family is not affected by an equal degree of aggressiveness and comes to the clinic only when pressure is applied by a community agency, such as the school, which does not have the same tolerance for aggressiveness. In clinical practice we find difficulty in effecting change in a child's pattern of behavior if his family has a high point of tolerance in regard to, or actually values, that behavior.

Subcultures within our communities also vary in their tolerance for, or valuation of different types of behavior. For example, in the Jewish Community Services of Long Island the staff of the child-guidance services has noted consistent differences in the types of problems coming from its usual, middle-income Jewish clients and those brought by children referred to the agency from a lower socio-economic community by the New York City Youth Board. Particularly noticeable has been the difference in the degree of parental concern and anxiety over the children's difficulties—a difference based not in higher and lower valuations of children, but rather in the level of parental tolerance of deviant behavior. If the values of the subculture did not conflict sharply with the prevalent middle-class values of the community as a whole many of these children would not reach the agency.

By what criteria then do we determine whether a child is sufficiently ill or his behavior sufficiently deviant to take him on for treatment? The very determination of a state of illness depends upon the social situation, including complex interactions within and between the family of the child, his subculture, and the culture of the larger community.

Only recently studies have been undertaken of the relation of culture and social institutions to mental illness. The findings have been quite consistent in showing the universality of such interrelationships though the dynamics are still unclear. These findings indicate a consistent and significant relationship between social class and the nature of psychiatric disorders.[2] The evidence points toward the importance of social and cultural factors in the etiology, persistence, and modification of emotional and behavior disorders. Yet to what degree do we give them consideration in our diagnostic and prognostic procedures?

PURPOSE AND GOALS

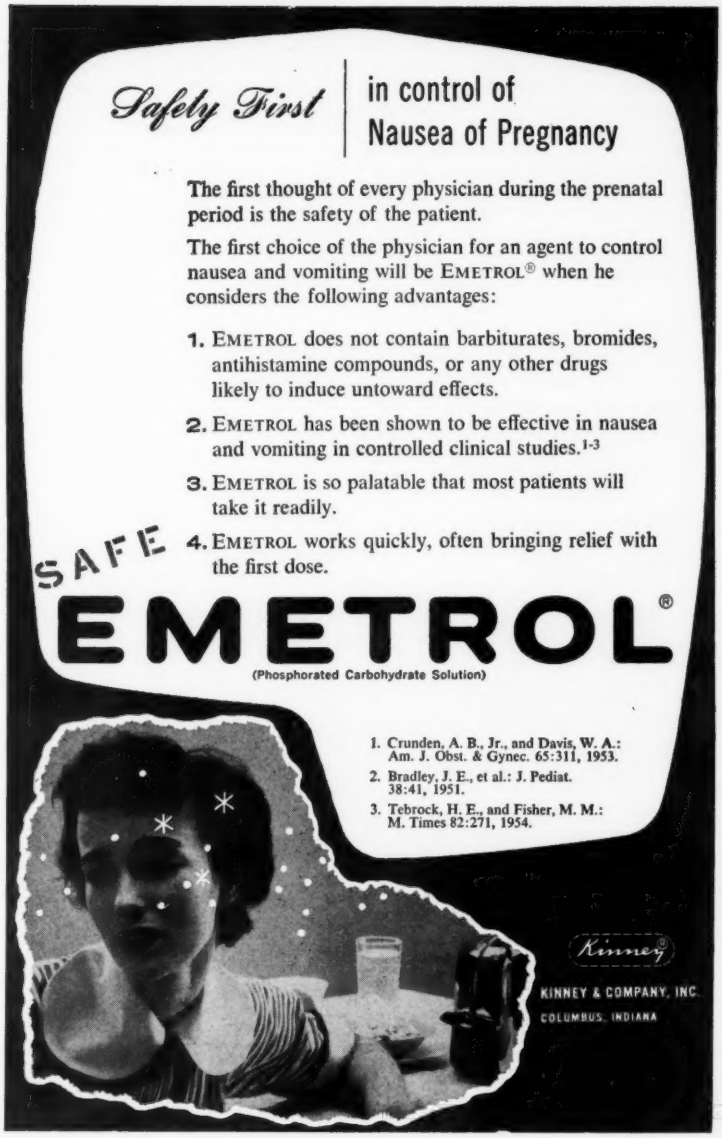
Once we have arrived at a particular diagnosis—a diagnosis which is at least in part socially determined—the decision whether this illness is treatable does not automatically follow. Treatability, from a practical point of view, is a relative

quality dependent not only upon the diagnosis but also upon a variety of factors external to the child. One of the most important of these is the purpose of the treatment agency. In a child-guidance clinic this is essentially a social purpose —to help the child live more effectively within the community. Treatability in any particular agency is further limited by the nature of the agency's staff, the resources available to it, and all too often by the attitude of the staff. The same child may be found untreatable in one clinic and treatable in a second. Some clinics have been established to treat only special problems. For example, a school clinic concerned primarily with the child's school functioning would not accept for treatment many children who function well in school but present serious problems at home, even if they are amenable to treatment. Similarly, the community clinic, with service for the entire community as its objective may often, because of limited resources, exclude as untreatable many children who could be helped were longer, more intensive, and more skilled therapy available.

Too frequently there has been a tendency to equate expediency or staff limitation with absolute treatability. For a long time therapists assumed that schizophrenic children were untreatable. However when special resources, including therapists with sufficient time, skill, and interest for such children were developed we learned that they could be helped. For instance, after meeting with a blank wall in trying to refer seriously disturbed children to appropriate treatment resources, the Jewish Community Services of Long Island obtained special funds for establishing a "long-term treatment project." The basis for the agency's assessment of treatability shifted as its purpose shifted. Once funds were made available with the precise purpose of developing treatment services for seriously disturbed youngsters living at home, the staff found that the determination of a child's treatability rested to a greater degree on the assessment of the family's ability to sustain the child and the community and school's ability to tolerate his behavior. The project is still too young for evaluation, but the agency has found that many seriously disturbed children can be helped into and to use treatment.

Child-guidance clinics also often exclude mentally retarded children or children with brain damage as "untreatable." Yet a few pioneering clinics and agencies, most of them established through the efforts of parents, have found that despite their intellectual limitation such children present emotional problems very similar to those of normal children and equally amenable to treatment methods.

What has been the reason for the exclusion of seriously disturbed or markedly deviant children from treatment agencies? This seems to derive from some absolute goal for treatment which rules out children incapable of attaining it. In the light of the social purpose of the clinic, the validity of such a procedure is open to question. Would it not be more in line with our purpose to recognize that few if any of our patients can reach an absolute goal and to offer treatment to enable children to function more adequately? While a retarded or other seriously impaired child may not be able to attain normality, if he can be helped to function more adequately in relation to others, if he can be helped to be happier, and if his parents can be helped to encourage and sustain his limited growth potential without pressure for impossible goals, would that not be an adequate base for acceptance by the clinic?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1. Crunden, A. B., Jr., and Davis, W. A.: Am. J. Obst. & Gynec. 65:311, 1953.
2. Bradley, J. E., et al.: J. Pediat. 38:41, 1951.
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THE PARENTS' INVOLVEMENT

The problem of selection is particularly difficult in a child-guidance clinic because a child is dependent in so many ways upon important adults about him. Furthermore, a child's personality, still very much in the process of formation, is continuously influenced by what happens within his family. His way of responding to these influences has particular value to him. His symptomatic behavior may be a reaction against the overwhelming closeness of his parents and their inability to help him establish an independent self. Or it may be a defense against internal needs and impulses, a defense built up often as a result of the internationalization of parental standards and values.

Often a child's symptoms may reflect his effort to obtain love and recognition by an identification with his parents' deeper but suppressed desires or conflicts. Since this behavior satisfies the parents' needs there is frequently a subtle encouragement of that behavior.

In one case a mother sought help with a 14-year-old daughter whose sexual precocity was alarming. The girl did not seem to progress at all in treatment until after the mother, in parallel counseling, became aware of her own repressed sexual needs which she tended to satisfy through her daughter's behavior. After each of her daughter's sexual experiences, she would question the girl in such detail that she led her on to the next step.

A child's sypmtoms also may reflect his confusion about, or his taking sides in, his parents' marital relationship. In situations of marital conflict a child often reflects the struggle between the parents and their effort to utilize him in that struggle. His behavior may also result from his reaction to the effort of either parent to find fulfillment through him of the needs which the marriage fails to fulfill. In many cases we find a mother turning to her child for the love which her husband does not show. In many others we find in a child's deviant behavior a reaction to his parents' attempt to realize frustrated ambitions through him. As we recognize the crucial role of family interactions in a child's behavior, the need for involving the parents in treatment becomes obvious.

Assessment of a child's treatability consequently must rest on the evaluation of the parents' capacity to involve themselves in the treatment experience and to work toward change in their relationship to each other and to their child. This determination of the parents' ability to change involves more than a diagnostic evaluation of each. A parent may be extremely disturbed and still be able, with counseling help, to find other ways of satisfying his neurotic needs than through his child. Where the parents cannot find other outlets for neurotic needs, where they must struggle against whatever changes are taking place in their child or constantly thwart them, therapy for the child obviously cannot be effective. As long as the parents are not involved, the child will resist treatment, unless he is old enough and has sufficient ego organization to carry a great deal independently.

With the present state of therapeutic knowledge, we must conclude that cases in which pathology in all of the members of the family is interwoven and mutually reinforced are not suitable for selection in most child-guidance agencies as presently constituted. Yet we must face the fact that such "pathological families" constitute a major source of community disbalance and tend to be self-perpetuating. Breaking into these pathological families, discovering ways of concurrently treating each of the members while working at modifications of the modes of interaction constitutes one of the most serious challenges to the combined skills of social work and psychiatry. Fortunately most families of emotionally disturbed children are not "pathological" in this sense though they have problems.

COMMUNITY RESOURCES

Assessment of treatability must be based not only on the intake worker's knowledge of his own agency but on a thorough familiarity with community resources and a sensitive and realistic understanding of family and community dynamics. In the community with no other resources, an agency may have to take on for treatment cases which in other communities might better be referred elsewhere. Moreover, while it is most desirable for a child to continue to live at home during treatment, some homes are so destructive and so resistant to change that the child might better be provided treatment either in a special institutional setting or after being placed in a foster family.

We must try to avoid, in considering treatability, either the automatic rejection of the idea of placement, or the too easy utilization of placement as a way of getting around the need for developing more fully our own treatment methods.

There is a real danger in the child-guidance field in the too complete restriction of cases to those for which the standard methods of treatment of child and parents hold promise. Witmer and Tufts, in a review of the effectiveness of delinquency-prevention programs, point out that child-guidance clinics, though originally established in the hope of reducing delinquency, through their intake policies have gradually excluded most delinquents from their caseloads.[3]

In view of the social responsibility of the child-guidance clinic, it is important to work toward a reversal of this trend. Somehow child-guidance clinics must find in intake procedures the means of accept-

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ing the more difficult children, and in therapeutic processes, the means of helping them.

OTHER FAMILY MEMBERS

Sometimes in describing family dynamics, child-guidance workers seem to assume that the typical family is made up of an only child, a mother, and perhaps a father. We often tend to neglect the interactional roles played by various other members of the family: siblings, grandparents, aunts and other relatives and friends. While a child's relationships to any of these persons may further complicate his problem, often he can derive from them enough support and satisfaction to counteract to a significant degree the failures in the parent-child relationships. Bossard's studies of the large family point to the role which older siblings play in a child's development.[4]

In some cultural groups certain relatives outside the immediate family are given important roles in the development of the child—for example, the grandmother in certain matriarchally oriented cultures. One JCSLI case centered around a Negro child, living with his parents, and a grandmother who took care of him while his parents worked. Though the mother and father seemed ready to become involved in working on their child's problem and the child seemed interested in getting help, they seemed unable to begin. After they canceled numerous appointments, the agency was about to close the case as "untreatable," but decided first to try to see the grandmother. When this woman came to the agency after considerable hesitation, she expressed a great deal of question about it and particularly about its Jewish connections. However, after expressing her doubts and gaining a sense of the agency's desire to help, her attitude changed. The child's parents and the child himself thereafter responded differently and eventually achieved considerable progress.

In another case a widowed mother and child who seemed to make a good beginning in treatment reached a point where they could not progress. The child seemed to be fighting his worker and the mother was not helping him. Throughout her interviews the mother had talked about her older brother who was enormously helpful to her and who also played an important part in the child's life. It became apparent that this man felt threatened by the agency and the family's involvement with it. The mother, feeling alone without his moral support, decided to withdraw herself and her child from treatment.

These cases illustrate the importance of considering not only relationships other than the parent-child relationship in determining "treatability," but also the possible effect of a particular plan of treatment on other members of the family. What will treatment of one child mean to his parents' relationships to their other children or to the child's own relationship to his siblings? How will the other children react to the frequent absences of the child and the mother?

In another case the JCSLI decided to discontinue treatment of one child until his mother could make plans for her other children, when it became obvious that their needs would be neglected if she made frequent trips into the city to visit the agency. In still another case, a child being seen at the clinic appeared to be helped, but his mother indicated in her interviews that she was displacing her hostility to a younger child who was now showing symptomatic behavior. As this development was discussed with her, the treatment goal was shifted toward helping her get therapy for herself and then for her child.

Another important consideration is the effect of a child's treatment upon his parents' marital relationship and other significant family bonds. Where mother and father disagree about the desirability of the child's undergoing treatment, where the father refuses to become involved in any way, or where treatment would have a deleterious effect upon the marriage, is it advisable to undertake it even if the child shows promise? In some instances it may be necessary to refer parents to a marriage-counseling service before attempting to treat their child. In others, skillful efforts by the social workers at intake toward involving the father in treatment may be effective.

COMMUNITY RELATIONSHIPS

Sometimes in our consideration of significant family relationships, we tend to lose sight of the fact that a child lives in a community as well as in a family, that he attends school, that he moves in a world of his peers with its own special

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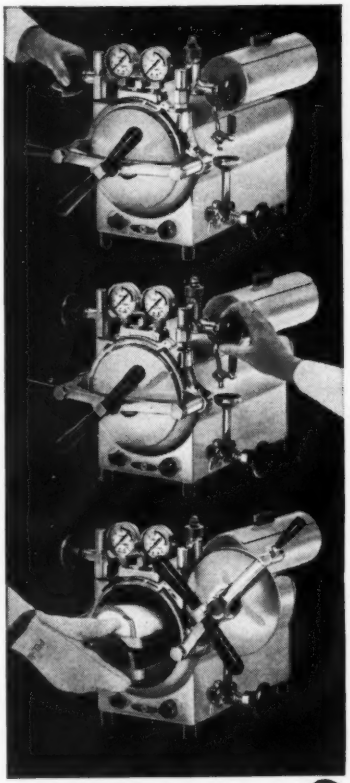

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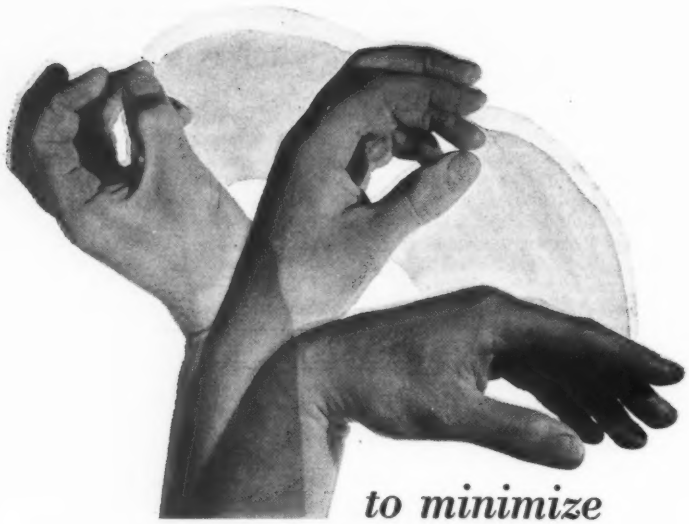

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standards. The expectations and relationships these bring to him may have tremendous significance for treatment.

In one case in which a retarded child seemed capable of using treatment, his teacher, though related positively to him, projected all the blame for the child's difficulties upon his parents and lost no opportunity for accusing them. In her resulting anxiety the mother repeatedly castigated the child and tried to push him beyond his capacity. She could make no progress in her problem with the child until the agency, through bringing the school principal and teacher into the treatment plan, could effect a reduction in the teacher's pressure on her.

A child's friends and his neighborhood are also an important consideration in determining whether treatment might help—especially in low-income neighborhoods in which a child uses behavior unacceptable to adults to gain status with his peers. If no substitute for the peer group exists for him, the clinic's efforts to change him may be of no avail. Said one child, as the possibility of treatment was discussed: "I can't be a sissy and still be in the gang."

"The gang," in this instance, included all the children in the neighborhood. Since the mother could not find other housing accommodations the treatment plan had to include consideration of the effects of change in the child on his social relationships. If treatment, no matter how effective immediately, results in a child's isolation, its ultimate effectiveness might well be open to question. Fortunately the mother in this case could be helped to relate her standards to the realities of the neighborhood.

This problem of poor relationships often is a serious stumbling block in clinics working with delinquent children. Yet, the work of the New York City Youth Board has demonstrated that many very difficult children whose families showed little readiness to use clinic help were treatable in an agency that was willing to seek out the families in their homes and use the authority implicit in the community to encourage them to try treatment.[5]

The selection of cases for treatment is also affected by what the community is ready to support. Where the need is great and resources small, criteria for selection may be established on the basis of serving the largest number of clients with the least expenditure of professional time. But as the community reflects through additional funds its increasing concern for the seriously disturbed child and for the retarded and exceptional child, more attention is likely to be spared for difficult cases. Since resources are never completely ample, clinics must be careful to resist "the tyranny of the waiting list,"—that is, selecting for treatment only the most promising cases and leaving the most serious ones untouched.

The social purpose of child-guidance clinics would seem to require them to take on some of even the most "untreatable" cases in an effort to develop ways of reaching them. Similarly their intake policies should leave some time for participation in efforts to prevent emotional disturbance. They need somehow to achieve perspective in dividing their energies among direct service, experimentation and study, and prevention. Moreover, the child-guidance field must recognize that the private clinic cannot fully meet the need for service.

ASSESSMENT OF SOCIAL FACTORS

There is no formula through which to give relative values to the social factors warranting consideration in selecting cases for treatment in a child-guidance clinic. One factor may be offset by another. For instance, a child with a relatively minor emotional difficulty may be untreatable if his parents are unable to change in any way and if no other sources are available to him for obtaining recognition and support. On the other hand, some children with enough drive toward health may be able to profit from treatment even if the parents are quite resistive to help. For some, other forces in their families or in the community may be of potential support even though their parents have little to offer them.

Assessment of this array of social factors is an extremely complex task. The dynamics involved often are not apparent until the therapeutic process is under way. However, therapy actually begins when the child and his parents first come to the agency. In this sense the diagnostic procedures are steps through which many

of those social dynamics can be reflected and tested out.

In addition to attempting to refine selection procedures, child-guidance workers may need to examine their therapeutic techniques more critically—particularly as they relate to family and social dynamics—and to experiment freely with ways of fulfilling their social purpose more adequately. A recent review of evaluation in mental health reported: "It is not uncommon for professional personnel working primarily in the area of diagnosis and treatment to assume that scientific evidence of results is more adequate or has progressed further in this area than in some of the other areas. In this review of the literature and studies in progress, such evidence has not been borne out."[1]

While child-guidance treatment methods are far from perfect, the techniques for selection remain considerably less refined. Ideally, selection is a process in which the worker's intuition and social purpose play important roles. Child guidance historically introduced the team concept as one way of dealing with the complex nature of its task. In the development of the field the purpose has tended to narrow to a psychotherapeutic concern so that in many clinics the potential contribution of the social worker to the team's operations has not been fulfilled.

With its long history of dealing with social factors, social work is an ideal position for exploring the social dynamics affecting a child and for making significant contributions to clinical practice. Assessing social factors and dealing with them creatively in the process of therapy constitute the essence of social casework in child guidance. This was recognized by the Group for the Advancement of Psychiatry, which concluded a report: "If a social worker in a clinic, with or without specialized training as a psychotherapist, is regarded primarily as a psychotherapist, and carries activities said to be psychotherapy, then the contribution which he makes, though it may be valuable, is no longer casework, and the clinic team can avoid a functional loss only by the employment of a social worker who does casework."[6]

The social factors involved in the emotional illnesses and behavior disorders of children are so dynamically interwoven that exploring and dealing with them sensitively with social as well as psychological awareness, experimenting with them, and integrating them into the total therapeutic process constitute a challenge to social work. To meet that challenge, social workers in child-guidance clinics must reaffirm the "social" in their professional heritage, enrich it from the experience of social work in other fields as well as from the social sciences, and realize their potential contribution to clinical practice.

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Hospitalization of young people*

One out of every 14 boys and one out of every 17 girls under age 20 are hospitalized in the course of a year, in the experience of dependent children of Metropolitan Life Insurance Company office and field personnel insured under the Company's Group insurance program. The study relates to claims involving at least one night of hospital stay on which first payment was made during 1954 and 1955.

The annual hospitalization rate for males was nearly one fifth higher than that for females, the figures being 69 and 59 per 1,000, respectively. Under age 5, the excess was about 30 percent, whereas at ages 15-19 the rate for males was the higher by only a small margin.

In each sex, the incidence of hospitalization showed the same age pattern—the highest frequency at ages 5-9 and the lowest in the very next age group, 10-14 years. For males, the annual hospitalization rates for the two age groups were 89 and 52 per 1,000, respectively; for females, the corresponding rates were 78 and 43 per 1,000.

Two thirds of the hospitalized cases in this study had surgery done; at ages 5-9, the proportion was as high as four fifths. The preponderance of surgical cases among these children reflected the relatively high frequency of tonsillectomies. For boys at ages 5-9, the hospitalization rate per annum for surgical conditions as a whole was 69 per 1,000; for tonsillectomies alone, it was 48 per 1,000. Similarly, for females the corresponding rates were 63 and 44 per 1,000. These rates do not fully measure the incidence of surgery among the children, inasmuch as the figures obviously do not include operations done outside hospitals.

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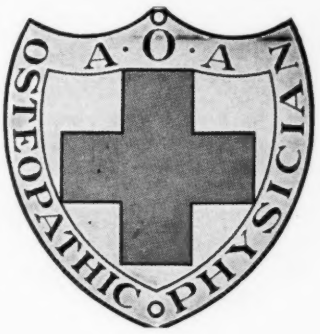

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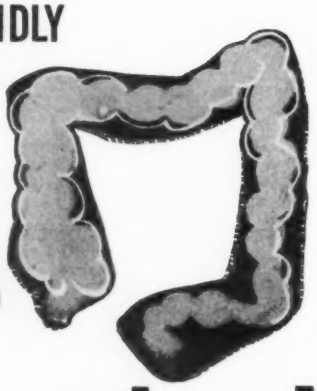

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The average length of hospital stay for the children under age 20 was 5½ days. Youngsters 5-9 years of age had the shortest stay, averaging not much over three days; this is accounted for largely by the fact that tonsillectomies, which constitute the bulk of the cases at these ages, required little more than one day in the hospital, on the average. Children at ages 15-19 had the longest stay—an average of about 9 days.

The children hospitalized for nonsurgical conditions stayed more than twice as long as the surgical cases. For males under age 20 not requiring surgery the average stay was 8.7 days, and for those with surgery it was 3.9 days; for females the averages were 9.1 and 3.5 days, respectively. About 38 days of hospital service were utilized annually by each 100 males under age 20; females required 32 days annually per 100 exposed.

Books received

Books received for review during the period from March 5 to April 5, 1957, are listed below. Reviews will be published as space permits.

DORLAND'S ILLUSTRATED MEDICAL DICTIONARY. Ed. 23. Cloth. Pp. 1598, with illustrations. Price $12.50. W. B. Saunders Company, W. Washington Square, Philadelphia 5, 1957.

THE PRINCIPLES AND ART OF PLASTIC SURGERY. Volumes I and II. By Sir Harold Gillies, C.B.E., F.R.C.S.; and D. Ralph Millard, Jr., M.D., Diplomate, American Board of Plastic Surgery; Assistant Clinical Professor, University of Miami School of Medicine; With a Foreword by Jerome Pierce Webster, M.D., Professor of Clinical Surgery, College of Physicians and Surgeons, Columbia University. Ed. 1. Cloth. Pp. 652, with illustrations. Price $35.00. Little, Brown and Company, 34 Beacon St., Boston 6, 1957.

THE PRACTICE OF MEDICINE. Edited by Jonathan Campbell Meakins, C.B.E., M.D., LL.D., D.Sc.; and Associate Editors. Ed. 6. Cloth. Pp. 1916, with illustrations. Price $16.00. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1956.

CLINICAL CARDIOPULMONARY PHYSIOLOGY. Sponsored by the American College of Chest Physicians. Cloth. Pp. 759, with illustrations. Price $15.75. Grune & Stratton, 381 Fourth Ave., New York 16, 1957.

THE DOCTOR AS A WITNESS. By John Evarts Tracy, Professor of Law (Emeritus), University of Michigan; Author of Corporate Foreclosures, Corporation Practice, Handbook of the Law of Evidence, and the Successful

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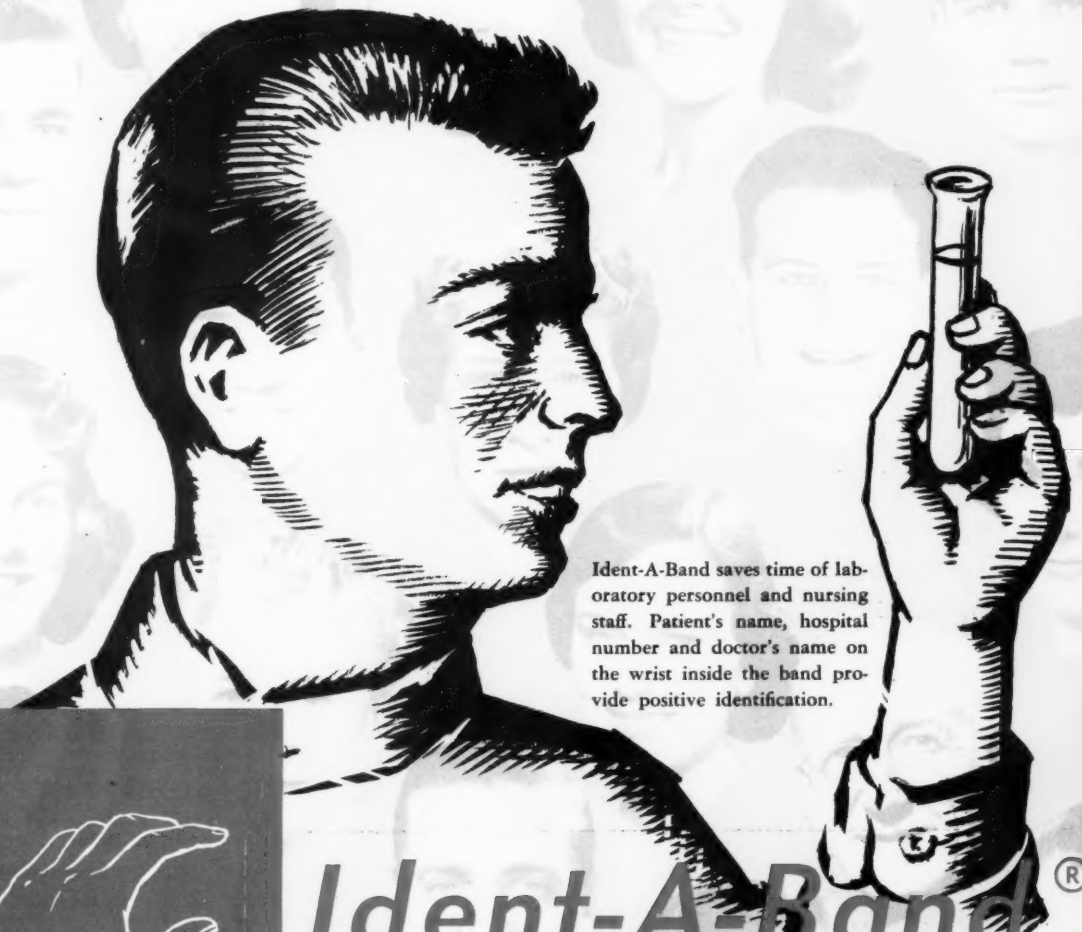

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Practice of Law. Cloth. Pp. 221. Price $4.25. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1957.

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RHEUMATIC DISEASES, RHEUMATISM AND ARTHRITIS. By Heinrich G. Brugsch, M.D., F.A.C.P., Assistant Professor of Medicine, School of Medicine, Tufts University; Physician-in-Charge, Arthritis Clinic of The Boston Dispensary, a Unit of the New England Medical Center; Diplomate, The American Board of Internal Medicine. Cloth. Pp. 330, with illustrations. Price $10.00. J. B. Lippincott Company, E. Washington Square, Philadelphia 5, 1957.

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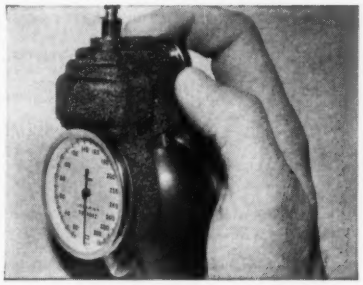

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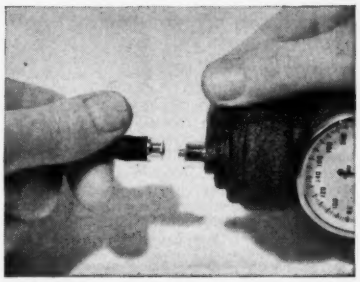

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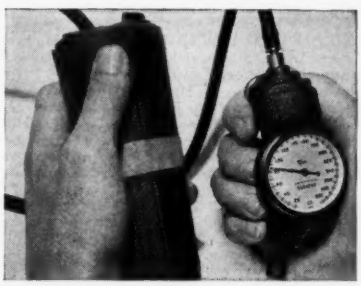

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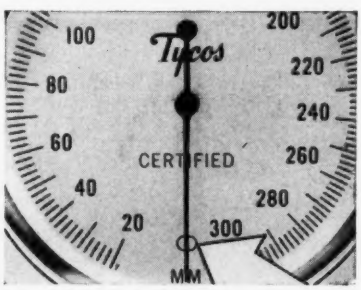

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INTRODUCTION TO PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY. By L. Earle Arnow, Ph.G., B.S., Ph.D., M.B., M.D., Vice President, Merck Sharp & Dohme Research Laboratories Division; Executive Director, Merck Institute for Therapeutic Research, Merck & Co., Inc., West Point, Pennsylvania, and Rahway, New Jersey; formerly Professor of Chemistry, Bryn Mawr College Summer School of Nursing, Bryn Mawr, Pennsylvania; formerly Assistant Professor of Physiological Chemistry, University of Minnesota Medical School, and Lecturer in Physiological Chemistry, University of Minnesota School of Nursing, Minneapolis; Revised with the assistance of Marie C. D'Andrea, R.N., B.S. in Nursing Education, Educational Director, School of Nursing, St. Vincent's Hospital, Indianapolis. Ed. 5. Cloth. Pp. 529, with illustrations. Price $4.25. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1957.

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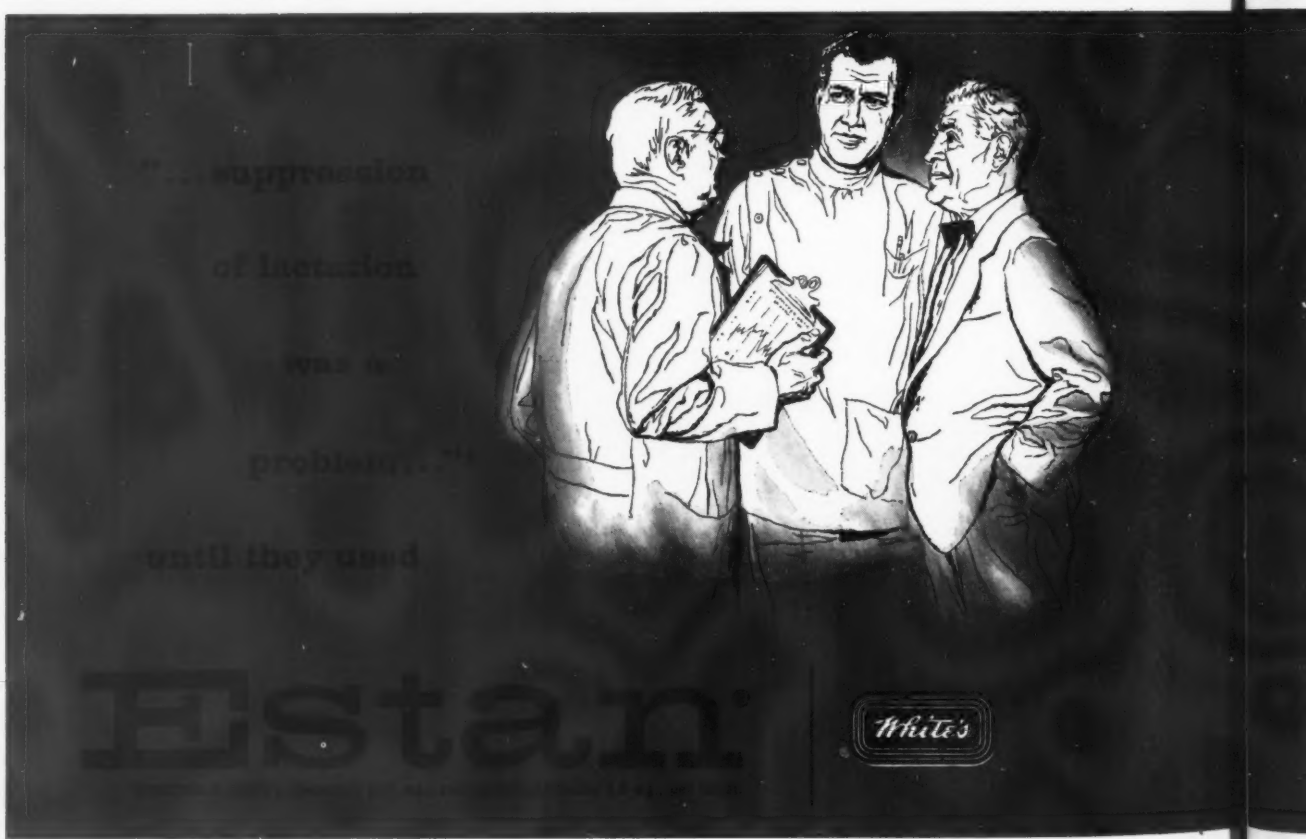

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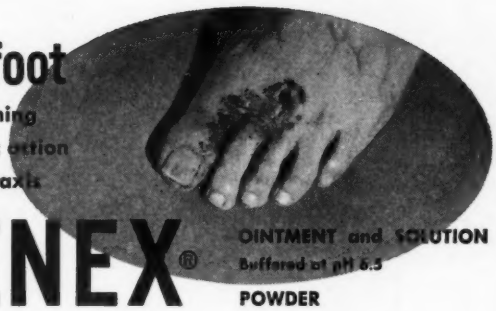

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References:

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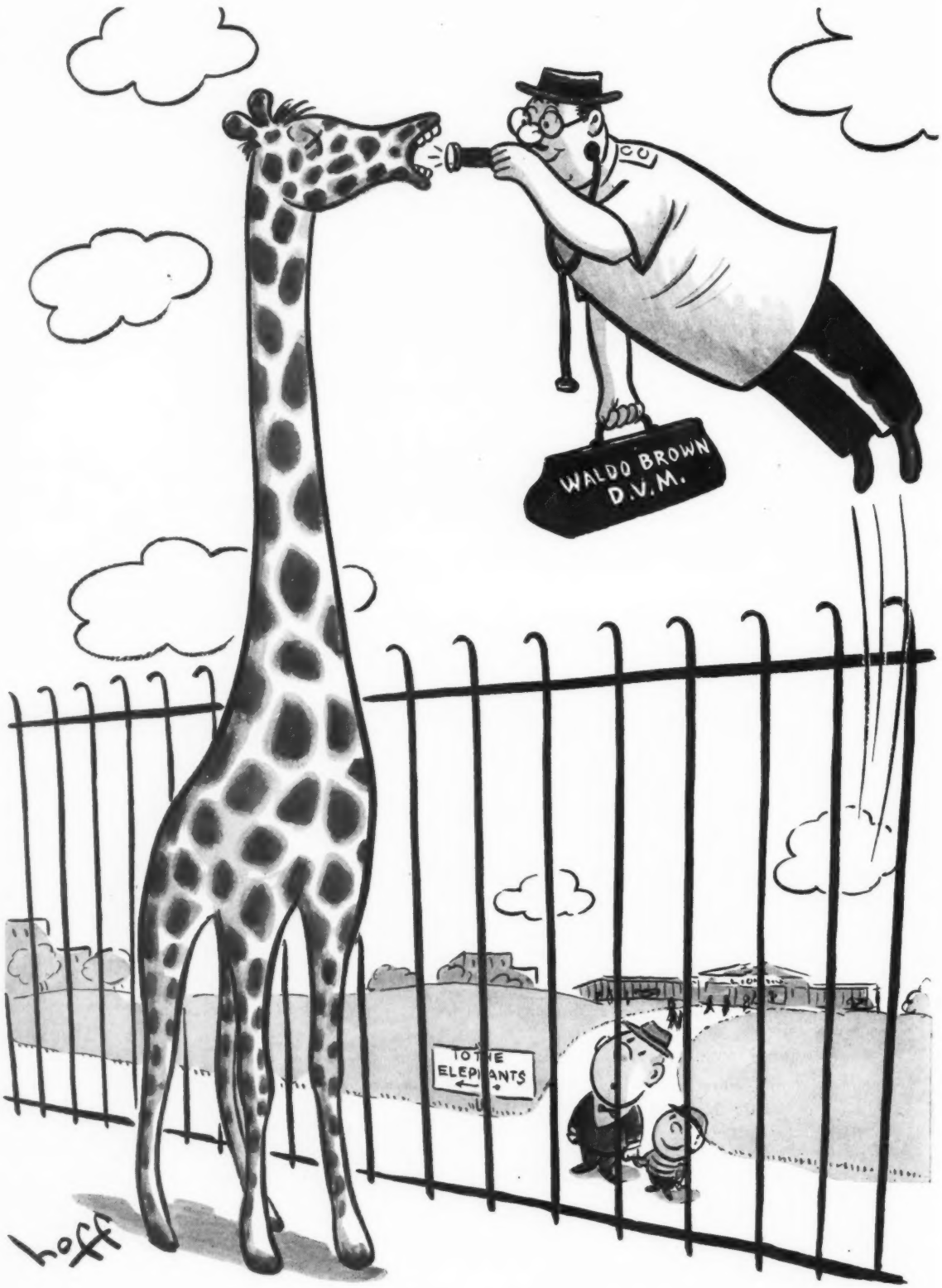

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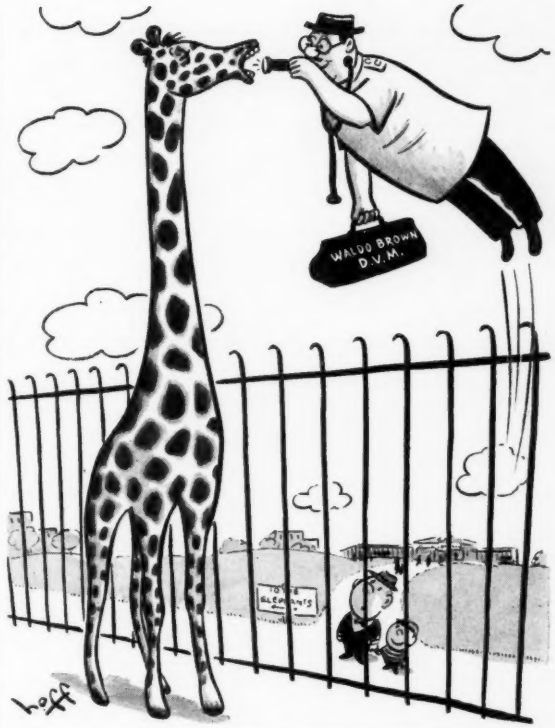

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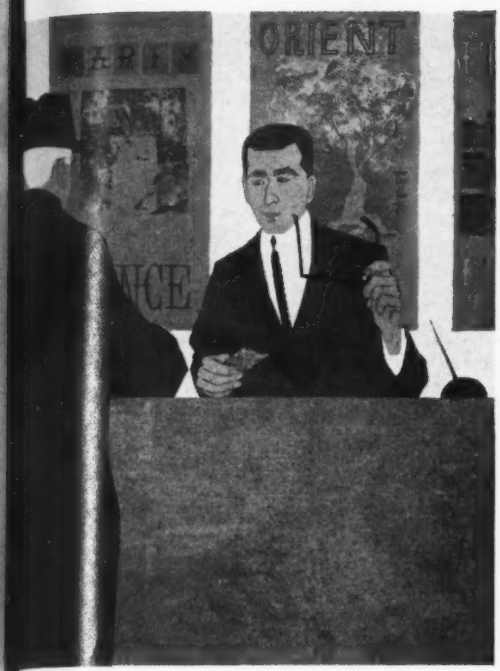

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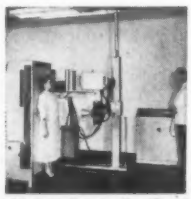

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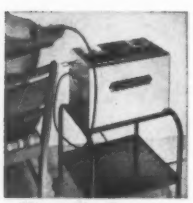

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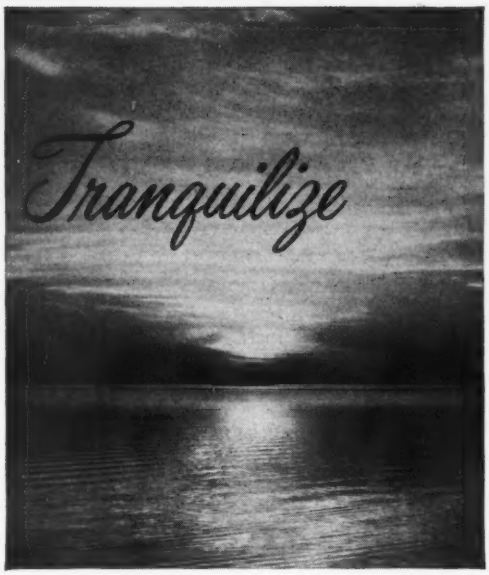

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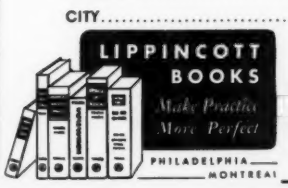

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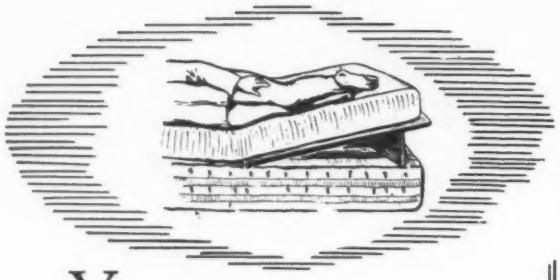

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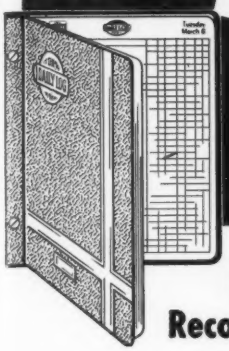

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American Osteopathic Assn., 42, 68, 99, 112
Ames Co., 52
Armour Laboratories, 86
Ascher & Co., Inc., B. F., 70
Ayerst Laboratories, 104, 105, 109

Becton-Dickinson & Co., 44
Bethco Bedding Corp., 113
Borcherdt Malt Extract Co., 100
Borden Company, 77
Breon & Co., George A., 45
Bristol-Myers Co., Cover II
Burroughs Wellcome & Co., Inc., 71

Cambridge Instrument Co., 110
Camp Co., S. H., 115
Chicago Pharmacal Co., 82
Ciba Pharmaceuticals, Cover IV, Insert Between 32-33
Colwell Publishing Co., 113
Cutter Laboratories, 48

Dartell Laboratories, 84
Davol Rubber Co., 49
Desitin Chemical Co., 81
Dietene Co., 83
Dome Chemicals, Inc., 88

Eaton Laboratories, 87, 92

Fischer & Co., H. C., 108
Fleet, Inc., C. B., 15

Geigy Pharmaceuticals, 114
Glidden & Co., Otis E., 113

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Kinney & Co., 95
Knox Gelatine, 19

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Lederle Laboratories, 6,-7
Leeming & Co., Inc., Thos., 75
Lilly & Co., Eli, 74
Lippincott Co., J. P., 111

McNeil Laboratories, Inc., 11, 25, 26, 72
Mallard, Inc., 111
Malbie Div., (Wallace & Tiernan Prod., Inc.), 103

Massengill & Co., S. E., Insert Between 68-69
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Mulford Colloid Laboratories, 36

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Organon, Inc., 80, 90
Orthopedic Frame Co., 94

Parke, Davis & Co., 106, 107
Pelton & Crane Co., 97
Pet Milk Co., 57
Pfizer & Co., Charles, 4, 9, 27
Picker X-Ray Co., 1
Pitman-Moore Co., 38
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Quaker Oats Co., 60

Rest-Well Products Co., 112
Riker Laboratories, Cover III, 37
Robins Co., A. H., 79, 93
Roerig & Co., J. B., 10
Rorer, Inc., William H., 76
Roussel Corporation, 17

Sandoz Pharmaceutical Co., 91
Saunders Co., W. B., Cover I, 99
Schenley Laboratories, 18, 20-21
Schering Corporation, 3, 12-13
Sherman Laboratories, 98
Shield Laboratories, 69
Smith-Dorsey, 85
Smith, Kline & French, 24, 34-35, 43, 89
Squibb & Sons, E. R., 33
Standard Pharmaceutical Co., 112

Tampax Incorporated, 23
Taylor Instruments Co., 101
Truform Anatomical Supports, 66

Vitaminerals, Inc., 67

Wallace Laboratories, 61
Wampole Laboratories, 53, 54
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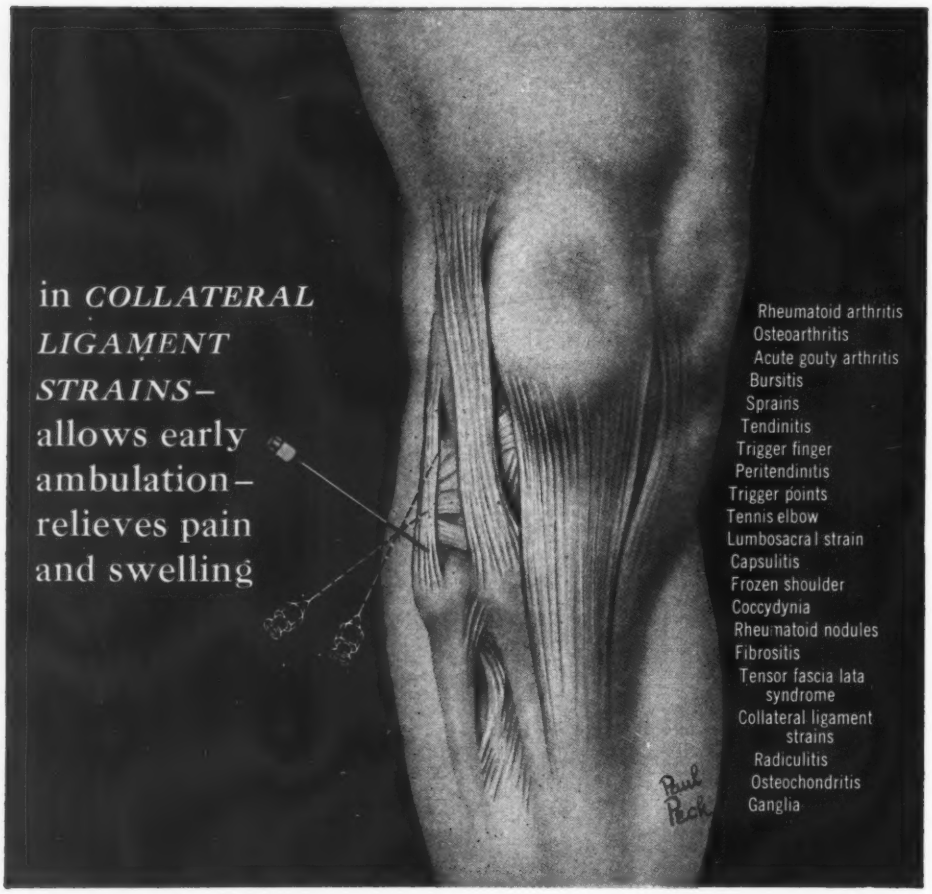
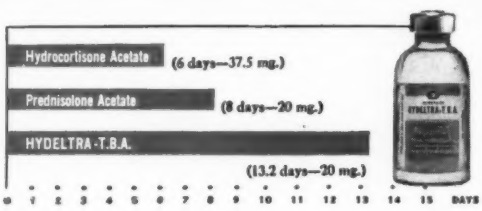


Duration of relief exceeds that provided by any other steroid ester


Hydrocortisone Acetate
(6 days—37.5 mg.)
Prednisolone Acetate
(8 days—20 mg.)
HYDELTRA-T.B.A.
(13.2 days—20 mg.)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 DAYS

Dosage: the usual intra-articular, intra-bursal or soft tissue dose ranges from 20 to 30 mg. depending on location and extent of pathology.

Supplied: Suspension 'HYDELTRA'-T.B.A.—20 mg./cc. of prednisolone *tertiary*-butylacetate, in 5-cc. vials.

MSD

MERCK SHARP & DOHME
DIVISION OF MERCK & CO., INC.
PHILADELPHIA 1, PA.

1. Hollander, J. L., *Paper read at conference in New York City, May 31 and June 1, 1955*

Rauwiloid®

A Better Antihypertensive

"We prefer to use alseroxylon (Rauwiloid)

since it is less likely to produce excessive fatigue and weakness than does reserpine."[1] Up to 80% of patients with mild labile hypertension and many with more severe forms are controlled with Rauwiloid alone.

1. Moyer, J.H.: J. Louisiana M. Soc. *108*:231 (July) 1956.

A Better Tranquilizer, too

"...relief from anxiety resulted in generally increased intellectual and psychomotor efficiency with a few exceptions."[2] Rauwiloid is outstanding for its *nonsoporific* sedative action in a long list of unrelated diseases not necessarily associated with hypertension but burdened by psychic overlay.

2. Wright, W.T., Jr., et al.: J. Kansas M. Soc. *57*:410 (July) 1956.

Dosage: Merely two 2 mg. tablets at bedtime. After full effect one tablet suffices.

Best first step when more potent drugs are needed

Rauwiloid is recognized as basal medication in all grades and types of hypertension. In combination with more potent agents it proves synergistic or potentiating, making smaller dosage effective and freer from side actions.

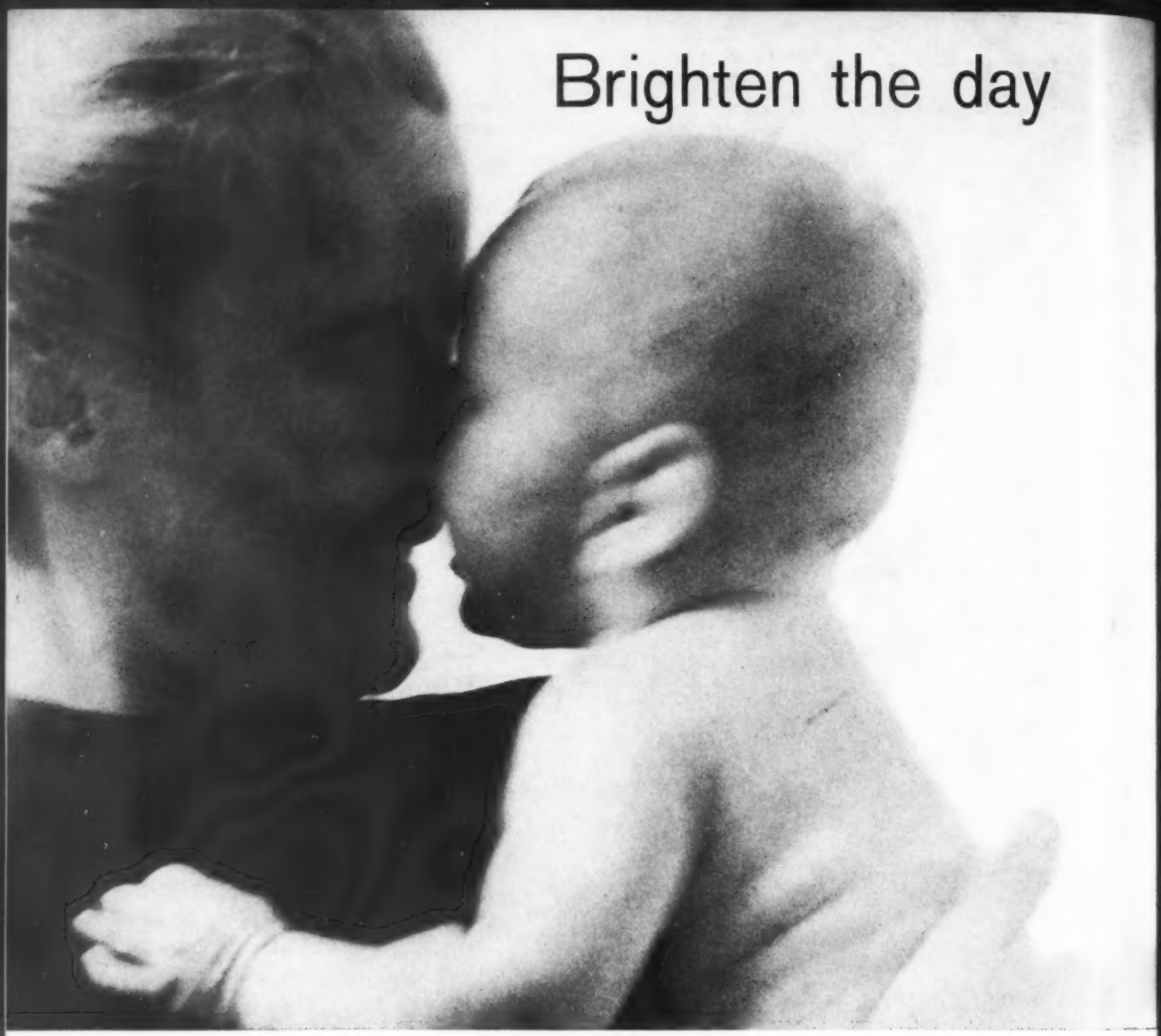
Rauwiloid®+Veriloid®

In moderate to severe hypertension this single-tablet combination permits long-term therapy with dependably stable response. Each tablet contains 1 mg. Rauwiloid (alseroxylon) and 3 mg. Veriloid (alkavervir). Initial dose, 1 tablet t.i.d., p.c.

Rauwiloid®+ Hexamethonium

In severe, otherwise intractable hypertension this single-tablet combination provides smoother, less erratic response to hexamethonium. Each tablet contains 1 mg. Rauwiloid and 250 mg. hexamethonium chloride dihydrate. Initial dose, ½ tablet q.i.d.

Riker LOS ANGELES



for the chronically fatigued, the chronically ill, the convalescent, the apathetic and depressed older patient, the postpartum patient, the oversedated, the retarded child with

Ritalin®

hydrochloride

(methylphenidate hydrochloride CIBA)

a new *mild* antidepressant, chemically unrelated to the amphetamines. Ritalin brightens outlook and renews vigor—counteracts drug sedative effects—often improves performance in the elderly. In most cases, Ritalin does not overstimulate, has little or no effect on appetite, blood pressure or pulse rate.

Average dosage: 10 mg. b.i.d. or t.i.d.

Supplied: TABLETS, 5 mg. (yellow), 10 mg. (light blue), 20 mg. (peach colored).

CIBA
SUMMIT, N. J.

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